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THE COVER: Montana's fields and forests are actually an outdoor supermarket, says Kim Williams in her article on "Wild Edibles" on page 11. The beautiful bitterroot captured on film for the front cover by Danny On is only one example. Should anglers release fish? If so, how? Do released fish live? See Ron Marcoux's article on page 28 for the answers. Back cover photo: Jon Cates

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The Director's Column

The Dept. of Fish and Game found itself with a new director on Jan. 3, 1977. Gov. Thomas L. Judge demonstrated a new approach to administering this agency when he appointed an "outsider" to assume the helm. I suppose the employees viewed this new appointment with mixed emotions and it is only fair to comment that I, too, experienced similar apprehensions when I accepted the governor's appointment.

As with any new position, the problems or areas needing attention pass on to the incumbent. I inherited several significant concerns—program budgeting, closure of private land to public access for recreation, the questions of Indian jurisdiction both on and off the reservations, a monstrous license structure in need of major overhauling, numerous legal involvements including a license structure challenge in the U.S. Supreme Court, the controversial issue of 1080, increased federal intervention in state resource management, the wilderness controversy, a gap in relations with the federal, state and private cooperators—to mention a few.

Given these areas of immediate concern, I began to assess the internal machinery of the department to determine who was available to assume more responsibility and if we were appropriately staffed. The complexities of an agency as diversified as fish and game require an accountable organizational structure which lends itself to resource management on one hand and service to the state's recreationists on the other. From my vantage point, an unresponsive bureaucracy had evolved in some areas of the agency which appeared to compromise the overall mission of the department. Some form of reorganization seemed a viable solution.

With this in mind, I developed the reorganization plan implemented on July 1, 1977. I believe it is presumptuous of a director to think he can stay in tune with all facets of a statewide organization and do justice to the resource, the public and the agency's mission. Bureaucratic machinery must look within itself periodically to reassess direction and modify its purpose, if necessary. From my perspective, the agency had become self-centered, compromising our credibility among several groups whose cooperation is essential to the accomplishment of our mission. I sought to promote a responsive bureaucracy which would rise to the challenges of the time and provide a service to Montana's recreationists.

I realigned the duties of the deputy director, placing more emphasis on administering the fish, wildlife and parks programs and added an associate director to administer the support services of the agency—law enforcement, conservation education, budgeting and accounting, licensing, legal services, drawings and general services. Thus far, I can see the development of several significant, positive actions. In the support service area, the license and drawing format is undergoing a complete overhaul in an effort to accommodate the needs of the recreationist; a clearer understanding of program budgeting is apparent; a simplified version of coding to reveal meaningful management information has been developed, and the Conservation Education Bureau is re-evaluating its activities to emphasize all aspects of the agency's mission.

On the program side, a coordinated, statewide effort is under way to identify the problems associated with private land closure and to produce a viable solution. An advisory board of landowners and recreationists has been created to assist and advise the agency's effort.

The integration of enforcement, conservation education, fish, wildlife and parks has been carefully considered in each of the agency's three major programs. I view this as a significant step toward eliminating divisionalism. To lessen divisional lines will strengthen resource management and produce a unified effort to serve our constituents.

Statewide comprehensive planning has produced two significant efforts within the agency: a "Strategic Plan" to manage fish and wildlife for six years and a "Statewide Comprehensive Outdoor Recreation Plan" to identify the major areas needing attention and some alternate strategies to accomplish the goals. These documents will serve as guides to budgeting, resource management, long-range planning and accomplishment indicators. For the first time, the public can review the agency's concerns in dealing with our three major programs. I view the planning process as a stepping stone for meaningful public involvement in management of recreational resources.

With the comprehensive analysis of the resources we manage, comes a clearer direction for future plans. Coal tax revenue appropriated for land acquisition by the past legislature is allowing the agency to expand its recreational potential, especially in eastern Montana. To date, we: (1) have acquired a boat launching area on the Yellowstone River near Miles City, (2) have expanded Makoshika State Park, (3) have been negotiating for over a year for preservation of Rosebud Battlefield, one of the most significant historic sites in Montana and (4) are currently investigating a possible large acquisition which has the potential for many recreational opportunities.

We have successfully negotiated the parcel-by-parcel purchase of Wild Horse Island on Flathead Lake as requested by the 1977 Montana Legislature and are now proceeding to develop a comprehensive management plan for this unique area.

The department administers a snowmobile program to assist in developing and maintaining areas open to the public. With cooperation of the Montana Snowmobile Assn., approximately 10 pilot projects are funded.

The nongame program has also received appropriate attention. The budget was increased, legislation is being prepared to qualify the state for federal funding under the Nongame Fish and Wildlife Conservation Act of 1978 and we are seeking a permit system for varmint shooting.

The constant pressure applied to our recreational resources keeps agency personnel stretching for innovative, workable ideas to insure the continual high-quality recreation Montanans have always enjoyed. We are rising to the challenges as quickly as resources and finances allow.

To this point, the reorganization has been focused primarily on the division and program level. One other significant change was implemented during this phase: Regional coordinators became supervisors with personnel supervision and complete responsibility at the field level for program and fiscal matters.

Like most new concepts, it takes time to reveal meaningful results measurable by onlookers. From my perspective, the concept is working and I have the agency personnel to thank. The concerted effort on their parts has been the driving force which brought us this far. Their dedication and selfless motivation is most commendable.

Robert F. Wambach

Fishing Record Recap

by Mike Aderhold

MONTANA WATERS ARE HOME to at least 80 different kinds of fish*. Fifty-two species are considered "native" and were probably here before 1800. The rest are "exotics," relative newcomers brought in from outside the state. Such popular sport fish as the northern pike; the brown, brook and rainbow trout, largemouth and smallmouth bass, crappie, perch and walleye were all imported, most since the turn of the century.

State law classifies 24 species as "game" fish and their taking is controlled by Dept. of Fish and Game regulations. The rest are grouped as "nongame" fish and harvest for private use is not limited. Local populations of eight nongame species are regularly used by some anglers —goldeye, black and yellow bullheads, bluegill, black and white crappie, yellow perch and freshwater drum. Some would also list the carp and two members of the sunfish family, the little green sunfish and the pumpkinseed.

In addition, the northern squawfish, the shortnose gar and eight of the nine members of the sucker family found in Montana occasionally take a baited hook and are sometimes caught for sport. In all, about 45 different kinds of fish feed and entertain the hook and line enthusiast. In 1977, 167,885 licensed residents, over 50,000 licensed nonresidents, thousands of unlicensed youths under 15 and thousands of residents over 62 (who can fish with a Conservation License) partook of the state's aquatic bounty. That's a lot of fishing, quite a few tons of fish and plenty of fish stories.

**Tropical aquarium fish have been illegally introduced into a few hot pools around the state. We are not concerned with those fish in this article.*—Ed.

Far right: Tom Colgan, Poplar, with his state record burbot (12 pounds, 9-¼ ounces) caught in the Missouri River near the mouth of the Poplar River. Although it didn't set a state record, Larry Piper, Glasgow, caught a 26-pound, 5-ounce northern pike four miles downstream from Fort Peck Dam. F&G photos: Mike Aderhold

It wasn't until 1970 that some fish biologists and information officers decided to put together an official state record list. All of the department's field force were informed of the effort through the department newsletter and regional offices were asked to forward names of candidates for the record list to the Helena headquarters.

Entry rules were finalized by Art Whitney, chief of the Fisheries Division and current president of the American Fisheries Society: (1) Fish must be legally caught by hook and line. (2) All record fish must be weighed on a government-inspected scale. (Almost all Montana grocery scales are tested annually by the Dept. of Business Regulation's Weights and Measures Division.) (3) Since the Dept. of Fish and Game is responsible for the accuracy of the record list, we prefer that new records be weighed and measured in the presence of a department employee. When this is impossible, an affidavit stating length and weight from the store where the fish was weighed is acceptable. (4) All record fish must be positively identified. Species easily confused such as sauger and walleye, black and white crappie, black and yellow bullhead and all trout and salmon species must be verified by a department warden or biologist familiar with the fish. Photos will be accepted only if they clearly illustrate the species' characteristics. (5) Other information needed includes date and place the fish was caught, method of taking (e.g., tip-up, snagging, bait casting, etc.) and name and address of the lucky angler so the department can send an official certificate of recognition.

The first official list of Montana's record fish was published in the July/August 1973 *Montana Outdoors*. It contained 18 fishing records. The next year, an updated list was published in the May/June issue to correspond more closely with the opening of fishing season and the list has since been published annually at this time. This year's list comprises 35 species and only 10 of the original records stand.

WALLEYE

Walleye, the largest members of the perch family, are the good-tasting fish with the large, glassy eyes. Native to large, cool bodies of water from the Arctic to Alabama, the fish was introduced into Montana early this century and seems to thrive in larger eastern Montana reservoirs. All three records on Montana's list have come from Nelson Reservoir in northeastern Montana:

12 lbs. 13 ozs.	James Crants, Wolf Point	12/69
13 lbs.	Robert Mills, Glasgow AFB	6/72
14 lbs.	Neil Berg, Wolf Point	12/74

In the walleye category, an event in 1968 stands out. On Aug. 1, Pete Czyzeski, then from Nashua, caught a huge walleye at Nelson Reservoir. The fish was so big it wouldn't fit in his ice chest so he took the head off, cleaned the fish and took it home. Mrs. Czyzeski weighed the cleaned fish on the bathroom scale and it registered 15 pounds! They filleted the fish and decided to call fish and game about it. It was too late for the record book, but the species was positively identified, the remains measured and a few inches added for the missing head. From length and weight tables for walleye, it was estimated the fish would easily have weighed over 20 pounds.

FRESHWATER DRUM

From time to time, the record for one species will receive a lot of attention. Then, the standard will reach a level that lasts for quite awhile. The most striking example occurred during summer 1973 with freshwater drum from Fort Peck Reservoir. The drum, sometimes called sheepshead or white perch, is native to the Missouri drainage. While it is not a game fish, it will take a baited hook. In good quality water, such as Fort Peck Reservoir, its flesh is firm and of good flavor. Our files show the record's progression:

4 lbs. 12 ozs.	Bob Ferguson	1972
5 lbs. 8-¾ ozs.	Dave Erickson, Glasgow	7/23/73
7 lbs. 2 ozs.	Robert Combs; Glasgow	8/6/73 (8 a.m.)
7 lbs. 11-¾ ozs.	Ruben Clark, Glasgow AFB	8/6/73 (11:30 a.m.)
11 lbs. 11 ozs.	Tony Dyba, Glasgow	9/10/73
13 lbs. 6 ozs.	George Gallagher, Glasgow	9/27/73

That's right—Robert Combs held a state fishing record for 3-½ hours! That's probably some kind of record in itself.

continued

I was out of town when George Gallagher's fish was weighed. When I returned, I called George and asked if I could come over and photograph the record catch. I had hoped to use the record setter to "drum" up more interest in the list. When I got to George's meat market, there was the state record drum—freshly cooked and already half eaten. I accepted a tasty offering from the newest state record, forgot about the photo and figured that's Montana—any other place they'd put that fish on the wall.

GOLDEYE, NORTHERNS

It's fun to see a youngster catch fish and especially satisfying to see a young one break into the record book. Damon Rush, son of Malta area warden Dennis Rush, was 10 years old when he set the state goldeye record at 1 pound, 13 ounces. The fish was caught in Nelson Reservoir in summer 1976 and held the record for 11 months.

In August 1972, 9-year old Lance Moyler of Sheridan, Wyo. crossed the Montana line to fish Tongue River Reservoir with his dad. When Lance went home, he took with him a northern pike weighing 37 pounds, 8 ounces. This fish broke the existing state record by 10 pounds. Our records show it is the only documented northern weighing over 30 pounds. It ranks with the paddlefish, Dolly Varden, brook trout and brown trout as one of the strongest records on the Montana list.

Al Elser, fisheries manager for the department's Miles City region, says that every year one or two pike in the 25- to 30-pound class are taken from Tongue River Reservoir. He said he has heard about one or two 30-pounders, but they were never documented. The biggest northerns outside of Lance's that have been officially weighed are:

29 lbs. 10 ozs.	Roger Moran, Glasgow	1/13/74 Ft. Peck Res.
28 lbs. 10 ozs.	Hiram Mahoney, Glasgow AFB	9/12/74 Ft. Peck Res.
27 lbs. 8 ozs. (former state record)	Ivan Dibblee, Havre	12/69 Fresno Res.
26 lbs. 5 ozs.	Larry Piper, Glasgow	3/9/77 Ft. Peck fishing pond

COHO

Some fishing records are fated to last a long time and the record for coho salmon is probably one of them. The coho or silver salmon is native to the West Coast, from mid-California to the Gulf of Alaska. It was introduced into Montana as early as 1917. In the late 1940s, it was planted in Georgetown Lake near Anaconda and Brown's Lake near Ovando.

Coho were released in Lake Michigan in 1966 with such astonishing success—some reached 20 pounds—that interest in the species was renewed in every state with suitable cold water habitat. In 1966, several big reservoirs in western Montana were restocked, including Georgetown Lake, Brown's Lake, Bean Lake and Cooney Reservoir. Two years later, Fort Peck Reservoir in eastern Montana was stocked. Unfortunately, the species never took hold like it did in the Midwest. The fish lived for about three years, spawned and then died. It boiled down to a "put and take" fishery. Because fishermen never caught enough coho to justify the stocking and there were problems obtaining disease-free eggs, the Fish and Game Commission dropped the program in 1974.

In December 1973, before the program was discontinued, Eldon Moos of Circle caught a 4-pound, 9¼-ounce coho in Big Dry Arm of Fort Peck Reservoir. A photo of the fish and an article on the catch appeared in northeastern Montana newspapers. Irven Stohl, Nashua, saw the article and brought in acceptable evidence of a 4-pound, 14-ounce coho caught off the face of Fort Peck Dam almost eight months earlier. Since the department is not planting any more coho, Irven's record will probably last a long time.

Then again, it may not. Last fall, four years after the last coho were stocked in Fort Peck Reservoir and one year longer than the fish usually live, three fishermen reported catching coho. All were from Fort Peck and in two cases, the species was verified.

BROWN TROUT

Brown trout are among the most difficult fish to identify. This is why we ask that easily confused species be examined by wardens or biologists who know the differences.

I recall a story that Bob Needham, now fisheries manager in Glasgow, told me about the time he was in on the identification of the state record brown trout.

It was April 16, 1966 and Bob was working in the Bozeman regional office for Bud Gaffney, then regional fisheries manager. Peck Bacon had caught a 29-pound fish in Wade Lake near Ennis. Peck called and asked if someone could come over and take a look at it.

It was Saturday, a couple of days later, when Bob and Bud drove over to Three Forks to check out the fish. By that time, word had spread around town and at least two dozen people were waiting to hear what the "experts" had to say. (The fish had been kept on ice in a Three Forks creamery.)

Bob says he can still see those folks rolling that cart out of the freezer. There was a huge fish in a box, frozen solid, covered with ice crystals, with only a few silver scales visible here and there. He said all he knew was the critter was big and would command a lot of attention . . . and that he and Bud had better figure it right.

Luckily, they brought along some fish identification keys. They knew right off it was a trout or salmon; the size ruled out brook and golden trout but that still left three trout and two salmon or the possibility of a rainbow-cutthroat hybrid. Also, there was the remote chance that someone was just having a little fun and had brought in a west coast salmon, a steelhead (sea-running rainbow trout) or an Idaho Kamloop (large landlocked rainbow trout). Bob commented, "All these possibilities, the people waiting for the 'word,' plus the fact we were not used to seeing fish this size held us up some. It was embarrassing," Bob recalled, and after some mumbling and shuffling we finally took out our books and got down to the serious business of keying it out. It checked out to be a state record brown trout. What threw us was the overall silver color browns take on in a lake

1978 Montana Fishing Records

Species	Weight	Angler	Year	Location
Bigmouth buffalo	25 lbs. 3 ozs.	Gaylord Hagen	1977	Fort Peck dredge cuts
Black bullhead	1 lb. 11 ozs.	Mike Mitchell	1977	Horse Creek (McCone County)
Black crappie	3 lbs. 2 ozs.	Al Elser	1973	Tongue River Reservoir
Bluegill	2 lbs. 8 ozs.	George Schlosser	1967	Dengel Reservoir
Brook trout	9 lbs. 1 oz.	John R. Cook	1940	Lower Two Medicine Lake
Brown trout	29 lbs.	E. H. "Peck" Bacon	1966	Wade Lake
Burbot (ling)	12 lbs. 9-¼ ozs.	Tom Colgan	1977	Missouri River
Channel catfish	21 lbs. 5 ozs.	Gary Eppers	1964	Missouri River
Coho salmon	4 lbs. 14 ozs.	Irven Stohl	1973	Fort Peck Reservoir
Cutthroat trout	16 lbs.	William D. Sands	1955	Red Eagle Lake
Dolly Varden	25 lbs. 10 ozs.	James Hyer	1916	unknown
Drum	13 lbs. 6 ozs.	George Gallagher	1973	Fort Peck Reservoir
Golden trout	2 lbs. 9 ozs.	Raymond D. Gallik	1975	Lightning Lake
Goldeye	2 lbs. 9 ozs.	Lester Estenson	1977	Nelson Reservoir
Grayling	2 lbs. 10 ozs.	Mark Daniels	1974	Handkerchief Lake
King salmon (chinook)	4 lbs. 7 ozs.	Berry Gillis	1972	Missouri River
Kokanee salmon	5 lbs. 15 ozs.	Forrest Johnson	1976	Pishkun Reservoir
Lake trout	41 lbs. 8 ozs.	John E. Boller	1975	Flathead Lake
Lake whitefish	1 lb. 9-½ ozs.	Jere Hightower	1976	Flathead Lake
Largemouth bass	7 lbs. 6 ozs.	Jere Hightower	1973	Ninepipe Reservoir
Mountain whitefish	4 lbs. 9-¾ ozs.	Mike Hangas	1977	Blackfoot River
Northern pike	37 lbs. 8 ozs.	Lance Moyler	1972	Tongue River Reservoir
Paddlefish	142 lbs. 8 ozs.	Larry Branstetter	1973	Missouri River
Pallid sturgeon	47 lbs.	Donald Rohlf	1977	Fort Peck tail waters
Rainbow trout	20 lbs.	C. J. Brohaugh	1952	Cliff Lake
Rainbow-cutthroat hybrid	17 lbs. 10 ozs.	R. A. Rousselle	1973	Ashley Lake
Sauger	7 lbs. 2 ozs.	Raymond V. Johnston	1975	Tongue River Reservoir
Shortnose gar	3 lbs. 1 oz.	John Johnson	1977	Fort Peck dredge cuts
Shovelnose sturgeon	10 lbs. 8 ozs.	Wes Gilbertson	1977	Yellowstone River
Smallmouth bass	4 lbs. 11-½ ozs.	Bob Higson	1975	Horseshoe Lake
Squawfish	5 lbs.	Alfred Arvidson	1977	Flathead Lake
Walleye	14 lbs.	Neil Berg	1974	Nelson Reservoir
White crappie	1.72 lbs.	Ken Walcheck	1972	Tongue River Reservoir
White sturgeon	96 lbs.	Herb Stout	1968	Kootenai River
Yellow perch	2 lbs.	Gerald Pottratz	1974	Nelson Reservoir

situation." Brown trout in streams usually have a light brown or tawny color, with black and red haloed spotting.

WORLD RECORD

The annually updated "Guinness Book of World Records" has become *the* catalogue of natural extremes. For fishing records, they print the standards ratified by the International Game Fish Assn. A more complete North American fresh-water record list is compiled by *Field & Stream* magazine. Its fresh-water list includes 54 species and two hybrids and is updated annually in the February issue.

Recently, a nonprofit organization called the "National Fresh-Water Fishing Hall of Fame" was founded in Hayward, Wis. The organization plans to maintain a record list for fish caught on fly and bait casting and spin fishing equipment. Also, it intends to keep records for fish caught on different line or leader-test classes.

On April 16, 1975, Allen Schrimsher, while fishing the tail waters below Fort Peck Dam with a leadhead jig and a minnow, hooked a pallid sturgeon. Very rarely observed and seldom caught, this primitive species and its close Montana relatives, the white sturgeon of the Columbia system and shovelnose sturgeon of the Missouri and Yellowstone, date back to fossil times. The catch weighed 42 pounds, 4 ounces and measured 65 inches long with a maximum girth of nearly 24 inches. The fish broke the former Montana angling record of 38 pounds set in 1950 at the mouth of the Tongue River. Allen filled out a detailed world record application and submitted it to the National Fresh-Water Fishing Hall of Fame. Later in 1975, Schrimsher's fish was officially recognized, making it Montana's first world record. But the state record was broken on May 7, 1977 when Don Rohlf of Great Falls took a 47-pound pallid sturgeon near the Fort Peck tail waters. As this magazine went to press, Don was writing down the address for the Fishing Hall of Fame. If his fish is properly verified, Montana will have its second world record—for the same species.

BIGGEST OF THE BIG

The gigantic fresh-water fish that once roved our major rivers and lakes are now, with a few exceptions, relegated to the past from whence they evolved.

Montana is fortunate to still have some examples—vestiges, if you will—of former times. The paddlefish is one such example. If you consider average individual size, the paddler population in the Missouri River above Fort Peck Dam survives today as the largest fresh-water fish population in the country. Three years of creel work on the Fort Peck paddlers, involving 340 fish (167 males, 173 females), showed a surprising average weight of 34 pounds for the males and an unbelievable 75-pound average for the females. Statewide, the average paddlefish caught barely exceeds 24 pounds.

In more ways than size, the paddlefish is a sight from the distant past. Compared to most other fish, it is slow growing (a 60-pound female may be 20 years old), slow to mature (12-15 years for females) and long lived (a 28-year-old paddler has been documented in the state). The fish's long snout, smooth skin, oddly hinged jaw, primitive nervous and digestive systems, unique sensory system, filter feeding habits and its still largely unknown spawning habits feed our curiosity. It is a "living fossil."

Unsubstantiated records of commercial catches hint at paddlefish weighing more than 200 pounds. The largest documented record is a 189-pound commercial fish cited in E. R. Kuhne's "Guide to the Fishes of Tennessee and the Mid-South." Since they feed on filtered plankton (microscopic plants and animals), paddlefish usually do not take bait and sometimes are not listed in angling records. There is no formal world record for the species.

Documentation for large paddlefish in Montana is also far from complete. Department files yield the following progression:

92 lbs.	(found injured)	1938	Missouri River, Fort Peck Dam
87 lbs.	Michael Jones	1964	Missouri River, Slippery Ann area
129 lbs.	William Bibeau	1965	Missouri River, Slippery Ann area
131 lbs.	Paul Frazee	1968	Missouri River, Slippery Ann area
142 lbs. 8 ozs.	Larry Branstetter	1973	Missouri River, Slippery Ann area

The current state record paddlefish was caught May 20, 1973 and was weighed and measured at the Slippery Ann Game Station and again on an inspected scale at Central Feed Co. in Lewistown. It measured 6 feet, 5 inches long and had a maximum girth of 41-¼ inches. Department employee Mike Baker checked the fish. The Lewistown newspaper carried a big photo of the trophy and the caption read, "Beginner's Luck?" Apparently, May 20 was Larry's first paddlefishing excursion.

Our records indicate about a dozen paddlefish over 100 pounds are taken each year in Montana, all from the upper Missouri. The all-time beginner's luck story is related by Lois Wesen of Glasgow. Lois works part time as a secretary in the Glasgow regional fish and game office. She had heard a lot of discussion about paddlefishing and decided to try it. With her mother, father and son, she drove to the Slippery Ann area May 17, 1975. With three witnesses—on her first cast, her first time paddlefishing—she hooked and pulled in a 103-pound paddlefish. This is especially surprising because the catch per fisherman per day at Slippery Ann is about .26. In other words, on the average it would take a fisherman close to four days to catch a single paddlefish in that area. It would probably take much longer to catch one that big.

NEW RECORDS

Since May 1977, four new species have been added to the list and four records broken. The species added include bigmouth buffalo, black bullhead, shortnose gar and squawfish. Records broken since May 1977 include those for goldeye, mountain whitefish, pallid sturgeon and shovelnose sturgeon.

Our record list is now considerably stronger than it was when first published, but there are still plenty of opportunities to catch a record fish. Most state fisheries biologists believe that with the possible exception of the coho salmon record, any entry on the list could be broken tomorrow. ■

The Catchall

Getting the Trash Out

The raven tugged furiously at the scrap of meat hidden among stale odors. The meat broke away from its barrier of paper and plastic, dropping out of a ragged hole in the swollen polyethylene bag that leaned precariously against an overflowing trash can. With determination, the big bird finished this prize and yanked another shred of plastic away from the green sack. The sudden motion allowed a soggy watermelon rind to find its way to the ground. It was followed by a beer can and then the corner of a box of discarded chicken bones. The raven had been dining sumptuously on this fare for a week now, at a dozen other camp sites where humans and their wasteful habits abounded.

In a given month, Dept. of Fish and Game employees service over 200 fishing access sites, recreational areas, parks and monuments, driving thousands of miles and spending hundreds of man-hours to collect and haul away many tons of trash. Four years ago, the department decided to borrow a time-tested method of garbage disposal from the Forest Service (FS). This method has since proved its value in good sense and dollar savings in over half of 140 state fishing access sites under department jurisdiction. It is called the "pack in, pack out system" and anyone using certain areas in Montana can expect to participate.

Don Hyyppa, assistant administrator of the department's Parks Division, clarified the plan: "It's a pay-as-you-go concept. What it does, essentially, is save nearly half the costs of maintenance at these sites and thereby frees this money for more valuable purposes, without sacrificing anything from the existing sites themselves. Until we instituted the pack in, pack out program, substantial costs were incurred in maintenance personnel, mileage, vehicle upkeep, dump fees, trash cans and plastic bags. With the new system, the only added cost at a site is the explanatory sign which informs users that they are being requested to carry out everything they carried in. It not only saves public money, but with the public's cooperation, it maintains the areas in a much more attractive state."

Let's briefly consider trash itself—bane of the outdoors person—to gain some idea of why it has been ringing up such big bills while layering the landfills.

The FS did that in 1968 with a multi-regional study of solid waste management in forest recreation areas. The study included a four-day observation of two campgrounds in the Gallatin National Forest of Montana. At one, 1,361.8 pounds of trash was collected; 40% (544 pounds) was classed as unburnable. Assuming that all campers in the area burned all their other trash (which they did not, in this study), this figure could be considered the minimum quantity of trash requiring collection. But the total amount of trash generated in this single campground over the study period represents the formidable volume with which federal and state recreation agencies must deal.

Although the bulk of the approximately 140 department-maintained fishing access sites are undeveloped campgrounds, these areas require some maintenance by department personnel. No statistics are available on the cost of waste disposal in these areas before the new system was adopted, but more recent figures suggest the amount of money being saved.

In fiscal 1977, about $26,000 was budgeted for maintenance of 140 fishing access sites, about half of which were classified as pack in, pack out areas. The other half received regular garbage disposal services. Assuming that about half of the maintenance at a site is in garbage collection, the department would have required an additional $86,000 just for waste collection in the 70 sites which are now classified pack in, pack out.

Hyyppa said the savings could be applied to better use, "primarily to the acquisition of new recreation lands and fishing access sites. Funds could also be applied to other facilities needed in certain existing sites where high visitor use demands them. These include signs, fencing and access roads." Hyyppa explained the department adopted a site protection development program a few years ago, a scheme which provides fishing access sites with minimum development and maximum protection against abuse for the area. As an integral part of that program, the pack in, pack out system eliminates collection costs while preserving the natural beauty of the areas. On the other hand, recreation areas and state parks generally have much heavier use and consequently more service needs than the average fishing access site.

Wes Burnett, chief of Planning and Program Administration for the Parks Division, underscored the difference between pack in, pack out sites and others: "Imagine a guy with his whole family and all their camping gear loaded up and driving here from California. He's been on the road for three weeks, stopping at state parks and recreation areas in every state along the way. He pulls up to a popular recreation area in Montana—like Bitterroot Lake—to have a picnic and discovers after the meal that there isn't a trash can for miles. It's simply asking too much of visitors or a site that receives this type of heavy use, so we aren't instituting the system in those areas." Fishing access areas usually are used by local residents in small parties; it isn't much trouble to ask each person to pack out what he packed in. Except for the occasional kegger or holiday celebration, these areas are consistently subject to low use, Burnett said.

When asked how the public has responded to the system, Parks Division Administrator Ron Holliday said, "We're finding it has been well accepted by the public in all the fishing access areas. People who use these areas are willing to make the effort to keep them clean. Ten years ago, we took a different approach. We set aside an area, put in an access road and left it alone. That turned out to be exactly the wrong way to do it. People abused the land and demanded more facilities on it. By controlling access while minimizing the development of facilities, we've found that people use the areas more respectfully.

"One advantage of the pack in, pack out system is that people are sharing the responsibility of maintaining the areas they use. And I know people are more litter conscious than they were, say, in the '50s," Holliday said.

When asked if any unforeseen problems appeared with the new system, Holliday replied, "Only when we begin to add other facilities at a pack in, pack out site. If there's only a sign at the parking area, people will go along with it. But if we install a privy, it has to be maintained. If we hire someone to maintain the privy, then it's only one small step more to have that person empty a trash barrel. When people see a trash barrel, they aren't going to be so willing to haul

recycled paper

out their trash. So you see, it complicates the program to add other facilities."

What about reducing the amount of garbage generated on a weekend picnic or camping trip? Holliday responded, "Just glance in any trash container nowadays and see if there are any aluminum cans. You can bet there will be plenty of them. These are recyclable and there isn't any reason why we can't make the effort to put them back to good use."

In a few states like Oregon and Vermont, glass bottles are also recycled. Roadsides, camp sites and other recreational areas are apparently remarkably clear of broken glass and crushed cans. To those who swim, wade, walk, run or bicycle in these states, recycling does more than satisfy anti-waste emotions—it means safer recreation.

Another contribution to the pollution solution is to break the habit of burying unburnables. As Holliday points out, "Not only do the corroded cans and broken bottles create a health hazard, but they render any camp site or picnic ground an eyesore to be avoided by all but scavenging animals. We really want to impress the message on people: *Don't bury your trash!*"

Next time you visit your favorite fishing access, pack out what you packed in. By dumping your refuse at home, you may be putting dollars into a new fishing spot. And if you're concerned about the local ravens starving, remember they were around and eating well long before we started providing home delivery service.—*Benjamin S. Kaghan*

Wildlife Shorts

The shortest of all snakes is the worm snake of the southwestern United States. It measures only four inches long.

* * * * *

Largest of all lizards is the Komodo. It was first discovered on the Indonesian island of Komodo in 1914. This dragon-like creature may attain a length of 11 feet and a weight of 280 pounds.

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The Egyptians had some knowledge of wild animals. Before 1,500 B.C., they used the parts and excretions of animals for medical treatments.

* * * * *

As strange as it may seem, frogs do not drink water. The thin, flexible skin covering the entire animal provides physical protection, excludes disease organisms, serves in respiration and is the means of water absorption.

* * * * *

Compared with man, the dog has a more delicate sense of smell, the cat hears sounds of higher pitch, the eagle has keener sight and the honey bee responds to light farther into the violet end of the color spectrum but less to the red end of the spectrum.

* * * * *

In a short-lived spider, there is no time to learn how to spin a complicated web by trial and error. This instinctive act undoubtedly evolved by natural selection over a long period.

Montana's largest carnivore is the grizzly bear which may weigh as much as 1,000 pounds. The smallest carnivore is the least weasel, weighing less than 2 ounces.

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About 2,500 species of snakes live in the world today. Of these, 114 species inhabit North America.

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More than 25,000 different species of fish exist in the world today. This is more than all other vertebrates put together.

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The most fertile reptile is the turtle. The female may lay from 7-300 eggs, depending on the species.

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We think blacktail jackrabbits are big in Montana, but you haven't seen anything until you've seen the Flemish giant. It averages 14 pounds, with an extreme example weighing 22 pounds.

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The heaviest of all flying birds is the South African bustard or paauw, with a weight of up to 40 pounds.

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The word "ecology" is derived from the Greek "oikos," meaning "house."—*Vince Yannone*

Movie Features Stillwater County

The National Wildlife Federation (NWF) has received a $10,000 grant from the Environmental Protection Agency to produce an educational film on the development of a rural refuse collection, processing and disposal system. The movie will be based on events in Stillwater County, Montana.

It will show how this rural area identified its needs, invited public participation in the planning process and then developed an effective method for solid waste management.

NWF, which conducted solid waste workshops in Montana last summer, has commissioned the film department at Montana State University, Bozeman, to produce the picture. It will be distributed nationally as an aid to other communities trying to develop or improve their waste management systems.—*National Wildlife Federation*

MO Rates Increase

Because of rising production costs, *Montana Outdoors* subscription rates will increase with the July/August 1978 issue. Rates will be $5 for one year (6 issues), $9.50 for two years (12 issues) and $13 for three years (18 issues). Our present rates are $3 for one year, $5.50 for two years and $8 for three years.

For the past three years, we've made an all-out effort to keep subscription prices down, although we were forced to increase newsstand rates from 75 cents to $1 per copy. In 1977, we published a special seventh issue on the Yellowstone River at no additional cost to the subscriber.

Although subscription rates will increase, we believe *Montana Outdoors* is still one of the best bargains around. We plan to feature the same kind of articles you've read in past issues, and we're producing another special issue.

You can beat the higher rates by ordering or renewing your subscription now. Just fill out the handy reply card bound into this magazine and return it to: *Montana Outdoors,* Dept. of Fish and Game; Helena, MT 59601.—*Marty Beatty*

More Bureaucracy For Trappers

Another recently conceived federal bureaucracy could lean heavily on states' management of wildlife. Weight of this agency, the Endangered Species Scientific Authori-

ty (ESSA), could be felt most in reduced value of some pelts, according to Fletcher Newby, deputy director of the Montana Dept. of Fish and Game.

ESSA is designed to regulate the international export of plants and animals which could be potentially endangered by uncontrolled international trade. Included under such regulations are pelts of bobcat, lynx and river otter.

ESSA isn't flatly banning all across-the-border movement of pelts, but is allowing some export from states that can prove adequate management of bobcat, lynx and river otter. Approval will be granted, provided: (1) the state has established a limited open season on all three species and requires reports on these species taken by any means, (2) the harvest level for 1977-78 can be justified, based on available information and (3) the state will make available a limited number of tags (minus the best professional estimate of the number of animals that will be taken, but whose pelts will not be exported internationally).

Since the department has management that meets these criteria and has made a strong case to ESSA, an initial quota of 1,070 bobcat, 200 lynx and 36 otter may be exported from Montana in 1978.

The department will continue to press for somewhat larger quotas which will still protect base populations. In stating its case, the department has pointed out that harvest of bobcat, lynx and river otter are controlled by seasons, bag limits and tagging requirements. In response to ESSA, the department noted, "No federal action was needed to bring the lion under management nor is any needed now to insure management of the bobcat. In fact, overprotection could, in a short time, result in loss of much concern that now exists for the bobcat's welfare. If we have learned anything from Canada lynx' irruptions, cat populations have a surprising capacity to spring back from low numbers when prey species become abundant. Management under state regulations can be flexible and responsive to such fluctuations whereas federal response is likely to be less timely. Economic predation resulting from irrupting populations can bring quick reversal of public concern if regulations are not realistic," the department concluded.

The department also pointed out that limiting export of pelts may encourage illicit traffic of the hides into Canada.

Whatever ESSA does in the future, its actions could have a marked effect on the price of animal pelts, especially bobcat and lynx. The department will take the steps necessary to insure an equitable export quota within limits of good management.

Update

When a Stream Gets in the Way—Move It

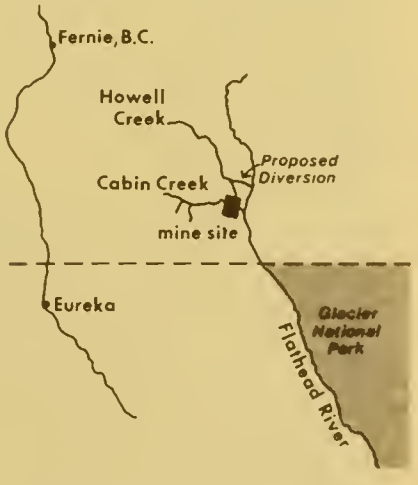
The uncertain future of the North Fork of the Flathead River was brought into question again recently with application for a license to divert Howell Creek, a major tributary of the North Fork, by the same company which hopes to unearth two mountains of coal at nearby Cabin Creek.

Howell and Cabin creeks are situated about nine miles north of the Montana border in British Columbia, and just west of Waterton-Glacier International Peace Park. Howell Creek, which flows at about 100 cubic feet per second at its lowest point during the year, is just under half the size of Rock Creek, a blue ribbon trout stream about 25 miles east of Missoula.

The application, submitted by Sage Creek Coal Ltd. (a subsidiary of Rio Algom Mines Ltd. and part of the British industrial conglomerate, Rio Tinto Zinc Ltd.), was filed with British Columbia's Water Rights Branch on Dec. 23, 1977. Sage Creek Coal has applied for a license to mine coal along the lower section of Cabin Creek and a decision on the license by the provincial government is still pending.

If the license for diversion is granted, the company will be allowed to rechannel Howell Creek away from the proposed mining site at Cabin Creek, run it through a man-made ditch for approximately three miles and then rejoin it with the North Fork at a point about two miles upriver from its present juncture. (See map.)

The reason for the diversion, according to company spokesmen, is to accommodate the mining operation as well as to avoid potential pollution problems. J. D. Little, an engineer hired by Sage Creek Coal to study the proposed project, told a Lethbridge (Alta.) Herald reporter in January that the diversion would help minimize pollution from surface run-off "which couldn't help but get in the creek unless it's moved." Bill Burge, an attorney in Vancouver, B.C., and an assistant secretary of Sage Creek Coal, told *Montana Outdoors* in February the purpose of the diversion, "in simple terms," is to "get the creek out of the way." If the creek isn't there, the company won't have to go through any "complicated procedures to keep it clean," he said.



Howard DeBeck, comptroller of the B.C. Water Rights Branch, said diverting the creek would also allow the company to dump overburden removed from the unearthed mountains into the area vacated by the creek.

In the long run, the proposed diversion would help make possible continuation of the company's plans for a major mining operation in the area. If realized, the plans would call for a town of up to 4,000 persons, a rail line into the mine, a coal cleaning plant, power lines, blacktop highways and, undoubtedly, an alteration of life styles, natural beauty and resources. (See "Good-bye North Fork?" in the Jan./Feb. 1976 *Montana Outdoors*.)

Not long ago, the coal company's plans were nearly halted (the proposed operation was labeled as "dead" by some B.C. government officials) when a

first proposal to divert the creek was denied by the province's Dept. of Mines and Petroleum Resources. However, under new Canadian guidelines, the provincial Water Rights Branch now has final say in deciding whether a license for diversion will be granted. The opportunity to submit another proposal appears to have given the company renewed hope.

Whether the decision on the application will determine the future of the mining operations at Cabin Creek is not wholly agreed upon. Burge explained that denial of the diversion would necessarily demand extra measures to keep the stream clean. He emphasized that present poor coal markets are having the most effect on delaying the project's development.

To lose any living stream to diversion is unpleasant, but to lose Howell Creek—or any portion of it—would be especially painful. Howell Creek is one of the major reproductive areas for Montana's Flathead Lake Dolly Varden trout population as well as a spawning and rearing ground for other species of fish, including the endangered westslope cutthroat trout. If the diversion receives the "go-ahead," fisheries biologists on both sides of the border agree that it could have a severely detrimental effect on future trout populations in the lake and river.

Bob Schumacher, fisheries manager for the department's Kalispell region, says he doubts very much that the trout will use the diversion ditch for their spawning activities or even for passage upstream. "You just can't expect the ditch to present the same kind of conditions to which the trout have evolved over such a long period of time," he said. "It appears the ditch will be shorter than the original creek, it will have an increased gradient and higher water velocities and there won't be any meanders or natural fish-holding areas." He added that the lower four miles of Howell Creek is used very heavily by spawning Dolly Vardens and that eliminating the essential spawning habitat on that stretch could have "a significant impact on the numbers of fish that spawn."

Although one of the company's reasons for diverting the creek is to control sediment run-off, Schumacher emphasized that sedimentation from the ditch itself may cause a serious problem. "Creeks have a natural tendency to meander," he said, "and any time you try to shoot one in a straight line, you're going to have problems."

He explained that the persistent gouging action of the stream on the banks of the ditch will undoubtedly add a large amount of silt to the water throughout the year. During periods of low water, such as is common during the Dolly Varden's spawning period from late August to mid-October, the silt may settle out of the slowly moving water and fill in the spaces or interstices in the stream's pebble bottom. The eggs of the Dolly Varden, buried four inches to a foot deep in these pebble bottoms, require a constant supply of fresh, oxygen-giving water to remain alive, he said. Any siltation which occurs during the spawning period may cause them to suffocate.

Although Sage Creek Coal has not stated how the ditch will be constructed, Schumacher warned that if it is to successfully replace the stream in all respects, it will have to be quite an elaborate affair, "more than could be made just by a ditching machine."

Norm Ringstad, B.C. fisheries biologist for the Kootenay Region at Cranbrook, similarly told MO that he doubted very much that the ditch would accommodate spawning. He also said construction of the ditch probably would call for a "major excavating project" or a "dike-type construction of some sort." The water in the ditch, he explained, will have to drop about 150 feet over the length of the ditch and that to contain a body of water the size of Howell Creek, the ditch will have to be of "very stout construction."

The British Columbia fisheries department presently objects to granting the license for the proposed diversion, he said, because the application "fails to address a number of concerns, one being the spawning and rearing sites which would be lost."

Burge said that although Sage Creek Coal is "sensitive" to the concerns for the area's fisheries, as yet, "nobody in the fisheries division" can say for certain how the planned diversion will affect the stream's fish populations.

"It's one of those unfortunate things," he said, "but no one will know for sure how it is going to hurt things until after it is built."

A Stage I impact assessment report, as required by B.C. law, is now before a Water Rights Branch review committee which will hear comments about the report from all line agencies of the provincial government before any decision on the application is made. After reviewing comments from the agencies, if the committee believes the company's assessment of the operation is lacking, it may ask the company to consider acceptable alternatives.

According to Dave Henderson, B.C. mines inspector at Fernie, any decision on the matter "is still a long ways down the road," but if alternatives must be considered by the company, "it could affect the economics of the whole operation."

The future of Howell Creek lies solely in the hands of the B.C. government. But American residents just across the border may have a recourse. Because effects of the decision will have international implications, under terms of the Boundary Waters Treaty of 1909, an International Joint Commission (IJC), composed of officials from both Canada and the United States, has the power to investigate the proposal and draw up recommendations to the Water Rights Branch concerning the proposal's implementation. It is hoped the IJC will initiate an investigation if it is deemed necessary.

Whether Howell Creek will survive, and on a larger scale, whether the North Fork will remain a clear, free-flowing river, must wait to be seen. However, along with pending applications for natural gas exploration in the Flathead National Forest and the extensive road building which has already occurred in conjunction with logging and exploration in the area, the proposed diversion deals one more blow to the chance of keeping the North Fork from becoming "just another river."

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If problems with the Cabin Creek mining and Howell Creek diversion proposals aren't enough, a large clear-cut logging operation in the Akamina-Kishinena Creek Valley just north of Glacier National Park and on the western border of Waterton Lakes National Park, may be more than enough to break the camel's back. The operation, which has cleared more than 500 acres of the area since last September and is scheduled to uncover another 10,000 acres in the next three to five years, threatens to add as much—if not more—silt to the North Fork than the operations at Cabin Creek.

In addition, new logging roads throughout the cuts may allow increased access to the backcountry area which has been proposed by the B.C. government for inclusion into Waterton Park. The area has also been recognized as one of the last remaining sanctuaries for the threatened grizzly bear and the endangered Rocky Mountain wolf.

Although beetle-infested pine are the only trees being cut, and the only clear-cutting is occurring in areas where pine is the only timber species, the U.S. Dept. of State has reportedly asked the B.C. Forest Service to suspend further cutting so all possible effects of the cutting on the park can be studied.

Regardless of what the other effects may be, the operation, in conjunction with the other utilization proposals, almost certainly spells doom for the North Fork if continued.—*Bill Phippen*

Recreation Guide:

Wild Edibles

by Kim Williams

EATING WILD PLANTS can be a part of the outdoors experience—whether you are a hiker, camper, hunter, fisherman or just a Sunday stroller along the river.

Knowing what berry you can pop into your mouth or what greens you can put in your salad can add a great deal to your pleasure in the outdoors. On a backpack trip, you can carry less on your back if you know what you'll find along the trail. In an emergency, you can survive.

Wild foods are free. Everyone likes something free. I do not condone going through the outdoors like Attila the Hun, digging up everything in sight, reaping harvests by the bushel basket. But a quart of berries here and there, a pail of chokecherries, a mess of lamb's quarter—nature can spare that.

In a way, it's paying homage to nature to gather from the wild. In our organized world of mile-long rows of corn and beans, it's almost a miracle to find a berry that grew without being planted, watered, fertilized or sprayed. When I eat something from the wild, I feel as if I am partaking in an ancient rite.

continued

Above: Cattail (Typha latifolia) *should be at the top of the wild edibles list. It's easy to recognize and all parts are edible, from fleshy rootstocks to the pollen blowing in the wind. photo: Harry Engels. Elderberries (*Sambucus*) can be blue, black or red. The pale blue berries have the best taste. F&G photo: Bill Schneider*

I also feel I am obtaining some vitamins and minerals that might not be in our everyday foods. I like to think the sun-warmed berries and woodsy leaves are putting magic in my cells.

Part of the magic might very well be the walking to find the wild foods. Foraging is a hobby that gets you out in spring and keeps you out in fall. And it's a hobby you can follow all of your life.

GREENS FOR SALADS AND POTHERBS

Before the era of supermarkets and vitamins in bottles, the first wild greens of spring were not only a treat but a medicine. Sulfur and molasses was the tonic for some, but for others it was a mess of dandelion greens or a watercress salad.

"Potherb" means "a green, leafy plant cooked like spinach." Whether you want to call lamb's quarter a potherb or a cooked vegetable or a mess of greens doesn't matter. The important thing is to know that fresh greens are as necessary for us today as they were back in the times when doctors pressed juice out of dandelion crowns to treat run-down patients. The scientific name, *Taraxacum officinale*, even means "officially recognized as a remedy for internal disorders."

The dandelion is the first spring green for many wild food enthusiasts. It is easy to identify, easy to find and easy to prepare. You can find it in your own front lawn. Of course, lawn dandelions are not as tender and tasty as the greens growing in a garden or near a barnyard. I tell the students in my classes to pick dandelions under a flatbed truck on the north side of a barn. Lawn dandelions growing in bright sun can be very bitter.

Very young plants are best. You can eat them raw or cooked. Raw, they are good in a tossed salad or chopped and added to potato salad, egg salad, creamed tuna, soups, stews or omelets.

Wilted dandelion salad is a favorite with many people. Fry bacon, drain off most of the fat; then add the washed dandelion greens, vinegar, salt and pepper.

All dandelion parts are edible. A choice part is the crown (the new stem growth between the root and the green surface leaves). The yellow flowers are sweet. I've eaten them as fritters, as part of a tossed salad and as an ingredient in a very fine fish or onion ring batter. (See recipes.) The flowers also make excellent wine. The roots can be used like parsnips (parboiled first to remove some of the bitterness) or roasted and ground to make a coffee substitute.

Watercress (*Rorippa nasturtium-aquaticum*) is both an edible wild plant and a commercial crop sold in the supermarket. It is better known in Europe than in America. Because of its peppery taste, it adds tang to salads, sandwiches and soups. It also adds vitamins and minerals, especially vitamin C, the anti-scurvy vitamin. Like dandelion, watercress has been known as a spring tonic since ancient days.

Wild asparagus is a treat. It is the exact same plant as cultivated asparagus (*Asparagus officinalis*), but finding a clump in the wild is like a Christmas present—not only because it is free, but also because it is so fresh. You can cut the spears and rush them to the cooking pot within minutes.

Lamb's quarter (*Chenopodium album*) is one of the most common wild greens. It grows almost anywhere you find disturbed soil. Since the plant has a very mild taste, it actually is a "wild spinach." You can use it raw or cooked.

Other common wild greens you might enjoy trying include: curly dock (*Rumex crispus*), wild lettuce (*Lactuca serriola*), nettle (*Urtica dioica*), chickweed (*Stellaria media*), redroot pigweed (*Amaranthus retroflexus*), purslane (*Portulaca oleracea*), stonecrop (*Sedum stenopetalum*), wild mustard (*Brassica nigra*) and milkweed (*Asclepias speciosa*).

Miner's lettuce (*Montia perfoliata*) and mountain sorrel (*Oxyria digyna*) are two plants generally found only by backpackers, hikers or wilderness campers.

ROOTS, BULBS

Roots are a marvelous food in an emergency because they have solid energy value. The drawback to digging them is that you kill the plant. Except for emergencies, I recommend limited use of wild roots.

An exception is cattail. You can dig all the cattails you wish because they are in no danger of extinction. Actually, the cattail (*Typha latifolia*) is one of the best wild food plants. It fulfills all the criteria of what an edible wild plant should be: (1) Anyone can recognize the cattail. (2) No poisonous plant looks like it. (3) The cattail has edible parts at all times of the year. (4) It is easily found. (5) It is plentiful. (6) It won't harm you, even if eaten in quantity. (7) It is easy to prepare. (8) It tastes good.

The most popular part of the cattail is the new shoot. Called "Cossack asparagus," it is the heart of the new plant and can be eaten either raw or cooked.

The rootstock (creeping underground stems) are starchy and can be roasted near a campfire. Some people have ground the rootstocks and made flour.

The new green spikes on top of the flower stalk can be cooked and eaten like corn on the cob. After the male spike turns yellow and starts to shed its pollen, you can walk in the marshes and gather a supply of pollen to make cattail pollen pancakes. (See recipes.)

Wild onion (of the genus *Allium*, but with many species) is well known. A note of caution when gathering any wild onion species: Be sure you know the difference between the onions and death-camas (*Zigadenus*, several species). A mistake can be fatal. It is best to gather only wild onions in flower. The flower blossoms of death-camas and onion are quite different, while the leaves and bulbs are similar. The flowers of onions are in an umbel (a roundish flower cluster with all the individual flower stems arising from one central point). The flowers of death-camas (and blue camas) are in a raceme (an elongated flower cluster with the individual blossoms arising at separate points up and down the stalk).

Other bulbs and roots used in great quantity by the Indians and pioneers were the bitterroot (*Lewisia rediviva*), blue camas (*Camassia quamash*), sego lily (*Calochortus nuttallii*), biscuit-root (*Lomatium* species), balsamroot (*Balsamor hiza sagittata*) and yampah (*Perideridia gairdneri*).

Others that were used in smaller quantity include: thistle (*Cirsium* species), glacier lily (*Erythronium grandiflorum*), bistort (*Polygonum bistortoides*), spring beauty (*Claytonia lanceolata*), arrowhead (*Sagittaria cuneata*), cow-lily (*Nuphar polysepalum*), salsify (*Tragopogon* species) and chicory (*Cichorium intybus*).

Wild chicory roots make good coffee. The roots resemble long, skinny parsnips; but when they are roasted and ground, they make a rich brown beverage that compares favorably to coffee. Of course, it contains no caffeine.

THE JOYS OF FRUIT

Fruit is the crowning glory of edible wild plants. It is a bounteous display for the eye and also the part of the plant that is easiest to use and the most plentiful. You do not harm the plant by using the fruit. In fact, you do the plant a favor by scattering the seeds.

The most popular wild fruit of the Rockies is the huckleberry. Actually, this berry is a blueberry. It is in the *Vaccinium* genus, which is the blueberry genus. But huckleberry is what Montanans call it, and I say, so be it. We can save the word "blueberry" for the common supermarket variety, which cannot in any way compare with its wild cousin.

Favorite uses of the huckleberry include pie, cobbler and jam. About seven or eight species of huckleberry exist, different in size and shape, but all delicious.

Wild strawberries (*Fragaria* species) are nectar and ambrosia to our taste buds but unfortunately, we can't find many of them. I usually have to content myself with gathering the leaves for tea. Wild strawberry leaves

Beware: Poisonous Plants

The best advice on avoiding poisonous plants is to eat nothing wild unless you are positive of the identification. Learning the common poisonous plants in an area can help in identifying the edible varieties.

If you do eat something you suspect is poisonous, rush to a doctor, taking along a sample of what you ate. If you are far from a doctor, try to make yourself vomit. In cases of mild stomach upsets, drinking milk often eases the discomfort.

The word "poisonous" does not necessarily mean "lethal." Some plants kill people and animals. Others possess toxic qualities that will cause illness—but not a fatal illness. A third category of toxicity might be termed "discomfort."

There are certain folk tale bits of advice that can lead you astray. For instance, some people say, "I eat what the birds eat." You can go very wrong on that. Birds eat both poison ivy and baneberry fruit.

Death-camas (*Zigadenus*) is one of the common poisonous plants in the Rockies which kills both animals and people. The bulb and new spring growth look much like the bulb and new spring growth of both the wild onion and the blue camas. The flowers are different: Death-camas flowers are greenish-white or creamy white, while blue camas has blue flowers. But there are four varieties of death-camas and they vary greatly in both form of plant and form of bloom. If you wait until the blossoms are out, your identification will be easier.

False hellebore (*Veratrum viride*) sometimes tempts spring campers into trouble because the new shoots of the plant look much like the new shoots of several edible plants.

Poison ivy (*Rhus radicans*) is a plant most people learn to recognize early in life, usually because they have had a bout of the rash and blisters caused by contact with the plant's toxic oil.

Water-hemlock (*Cicuta douglasii*) is said to be the most poisonous plant in the north temperate zone. One good-sized bite of the rootstock is enough to kill a person. Water-hemlock is sometimes called cowbane (very appropriately, since cows have died from eating the plant) and also poison-hemlock. However, the true poison-hemlock, which is the plant that killed Socrates, is *Conium maculatum*, also a member of the parsley family.

Little larkspur (*Delphinium bicolor*) is in the buttercup family, the same family as the poisonous monkshood and baneberry. Little larkspur causes considerable livestock loss.

Monkshood (*Aconitum columbianum*) is related to the garden plant of the same name. All species are toxic.

Baneberry (*Actaea rubra*) has lovely shiny berries, either scarlet red or milky white. Children are tempted to pick them, but eating the berries can cause death.

Western blue flag (*Iris missouriensis*) looks like a small garden iris and is toxic, as are garden irises.

Henbane (*Hyoscyamus niger*) is a poisonous plant that can lead people into trouble because the dried seed stalks have a very interesting form and people bring them home for dried flower arrangements. The vase-shaped seed capsules are full of tiny seeds that resemble poppy seeds.

Jimsonweed (*Datura stramonium*) also possesses seeds that tempt children. This plant has been known for centuries for its hallucinogenic qualities, but its use can lead to death.

Climbing nightshade (*Solanum dulcamara*) is a common plant that grows in the wild and in backyards. It has shiny red berries. Every year, some children have to be rushed to the hospital to have their stomachs pumped because they eat the berries. It is not easy to teach children the rules for eating wild plants safely. It is best to teach them not to eat *any* wild plant unless it is picked for them by an adult.

Right: The morel mushroom (Morchella) *is one of the delicacies of wild edibles. Look for it in spring in damp shady areas. photo: Frances V. Davis. Below: Watercress* (Rorippa nasturtium-aquaticum) *must be gathered only where the water is clean. F&G photo: Mike Aderhold*

Far right: Squaw currant (Ribes cereum) *is better for jelly than for eating out of hand. There are many species of wild currant, some better tasting than others. Wild gooseberries (also* Ribes*) are very similar to currants. photo: Larry S. Thompson. Right: Oregon grape* (Berberis repens) *has clusters of powdery blue berries that look and taste like wild grapes. photo: Vince Claerhout*

Far left: Serviceberries (Amelanchier alnifolia) *are good right from the bush. You also can call them sarvisberry or saskatoon. photo: Danny On. Left: Glacier lily* (Erythronium grandiflorum) *has many edible parts—young leaves, seed pods and underground bulbs. Making a salad from the leaves and seed pods will not harm the plant but digging up the bulbs kills it. Wild strawberries* (Fragaria) *are a delight to the palate. The leaves make a vitamin-rich tea. photos: Harry Engels*

produce a fine tea, very high in vitamin C. (See recipes.)

Serviceberry (*Amelanchier alnifolia*), also called sarvisberry and saskatoon, is one of the earliest fruits to ripen. It was a favorite with Indians and settlers; they used it for pemmican and preserves and, of course, as a fresh fruit eaten out of hand.

Wild currants and gooseberries (*Ribes* species) vary so much in taste and quality that you have to simply try them and see if you want to eat them. Some make good jelly, some are bitter and others are tasteless; none is poisonous.

The wild raspberry (*Rubus idaeus*) looks much like the cultivated variety, except it is much smaller. If you are lucky enough to find a good patch, you can pick enough to make a pie, preserves or shortcake.

Thimbleberry (*Rubus parviflorus*) looks like a big flat squashy raspberry and can be used interchangeably in raspberry recipes.

Among the late summer, early fall berries are elderberry (*Sambucus* species), Oregon grape (*Berberis repens*) and chokecherry (*Prunus virginiana*). These make excellent jelly, syrup and wine.

Rose hips are in a class by themselves. You don't eat them as a fruit, but they can be used for jam, jelly, syrup or dried for tea. Rose hips are the seed pod of the rose bush (*Rosa* species). Around the seeds is a red-orange pulp which is edible and which contains a phenomenal amount of vitamin C. You can pick all the rose hips you want. Nature provides wild rose bushes in great quantity.

Buffaloberry (*Shepherdia argentea*) is better known in eastern Montana. The Indians cooked the berries into a sauce which they used with buffalo meat, hence the name "buffaloberry." Pioneer families also utilized it for pie and jelly.

MUSHROOMS

Eating wild mushrooms is not recommended unless you are willing to study hard and follow all the rules. People have died from eating the wrong mushroom. There are thousands of species and some of the edible varieties look almost exactly like the poisonous ones.

Favorite Recipes

Huckleberry Muffins

2 c flour
½ t salt
2 t baking powder
⅓ c sugar
2 eggs
¾ c milk
3 T oil or melted butter
1 c huckleberries, lightly floured

Mix dry ingredients together. Beat eggs, add milk and oil or butter. Pour the liquid ingredients into dry ingredients and mix gently. Do not overmix. Fold in huckleberries. Bake in greased tins in preheated 400°F. oven for 20-25 minutes. Makes 24 muffins.

Creamed Nettles

3 c new young nettles
2 T oil or butter
2 T flour
1 c milk
2 T onion, minced
salt, pepper to taste

Cook nettles in a small amount of water for 4 minutes, or until tender. Drain. Save cooking water for soup or health juice drink. Chop nettles.

Heat shortening with flour in saucepan, stirring and blending over low heat for 3 minutes. Cool. Add milk, onion, salt and pepper and put back on stove. Stir constantly, cooking until sauce is thick and smooth. Add nettles. Serves 4.

Thimbleberry Tarts

pie crust recipe, enough for one crust
1-½ c thimbleberries
½ T cornstarch
½ c water
2 T sugar or 1 T honey (more if berries seem tart)
yogurt or whipped cream

Mix dough for pie crust and roll out. Cut into 3-inch circles. Bake. Mix cornstarch, water and sugar, blending until smooth. Add to thimbleberries and cook until thick (only a minute or two). Put 2 spoons of thimbleberry sauce on each tart and top with yogurt or whipped cream.

Dandelion Batter for Fish or Onion Rings
(thanks to Lou Parrett, Butte)

1 c whole wheat flour or ½ c white flour and ½ c bran flakes
1 t baking powder
¼ t salt
1 egg
½-1 c milk (depending on desired consistency)
60-100 dandelion blossoms

Place all ingredients in blender and mix to a smooth consistency. Coat fish or onion rings and deep fry.

Wild Strawberry Leaf Tea

4 t dried, crumbled wild strawberry leaves
4 dried rose hips
1 curl dried orange rind
1 quart boiling water

Place dry ingredients in heated teapot. Pour boiling water into pot. Let steep 10 minutes or longer. Serve with honey as sweetener.

The best way to start learning about mushrooms is to take a course—preferably a course with field trips, so you can see the mushrooms growing in the ground. You will also need reputable books—field guides with illustrations.

Most mushroom hunters start with two or three kinds that are so distinct in appearance that it would be hard to confuse them.

Giant puffballs (*Calvatia* genus) are in that class. If you find a puffball as large as a basketball, there is no danger. There is nothing else it can be but a puffball. Take it home, slice it up and cook it for dinner. Puffballs can be prepared like eggplant—fried, in casseroles, scrambled with eggs, baked with tomato and cheese, even as the main ingredient in a meatless meat loaf.

Morels (*Morchella* genus) are probably the most prized of wild mushrooms. The one caution about picking morels is to distinguish the true morels from the false morels. False morels can be dangerous. (True morels have a pitted, cone-shaped head; false morels are convoluted like brain tissue.) Morels are so delicious you don't need fancy recipes. Sauté them quickly in a small amount of butter or oil.

Shaggy manes (*Coprinus comatus*) are often found in huge quantities, growing in clumps along shady, graveled roads. People have picked half a bushel in a hundred yards of roadside.

You don't need to worry about how many mushrooms you pick. The underground structure, called mycelium, stays in the ground to produce another harvest.

Meadow mushrooms (*Agaricus campestris*) are related to the mushrooms you buy in the store. You can gather your own in fields and meadows if you learn to identify them. The doubt about meadow mushrooms arises because they have gills and a white cap and a class of poisonous mushrooms also has gills and a white cap. These poisonous mushrooms are the *Amanitas* and they are extremely dangerous. If you want to eat meadow mushrooms, you must be able to distinguish them from the *Amanitas*.

Don't trust any so-called "tests" for poisonous

Lentil-Lamb's Quarter Soup

1 c dried lentils
1 T oil or bacon drippings or ham fat
1 onion, diced
½ clove of garlic, diced
1 carrot, diced
1 rib of celery, diced
pinch of thyme
pinch of oregano
1 t salt
5 c water
½ c lamb's quarter, cooked and chopped
grated cheese

Cook onion and garlic in oil until translucent. Add all ingredients except lamb's quarter and cheese. Simmer until lentils are soft, about 35 minutes. Add lamb's quarter and simmer 5 minutes more. Before serving, sprinkle grated cheese over individual servings.

Cattail Pollen Pancakes

1-¼ c flour
¼ c cattail pollen
½ t salt
1-¾ t baking powder
2 eggs
1-¼ c milk
3 T oil or melted butter
1 T honey

Sift dry ingredients into a bowl. Separate eggs. Mix egg yolks with milk, oil or butter and honey. Pour liquid ingredients into the dry ingredients. Mix gently. Beat egg whites until stiff. Fold them into batter. Bake on preheated griddle. Makes 15 pancakes.

Purslane Pie

1 baked pie crust, preferably made with whole wheat flour or partly from rolled oats
1 c purslane, cooked
2 t parsley, chopped
2 T butter
2 T flour
1 c milk
½ t salt
dash of pepper
1 egg
¼ c cheddar cheese, grated

Melt butter. Add flour and blend over low heat. Cool. Add milk, salt and pepper. Cook until thick. Beat egg into sauce. Place cooked purslane and parsley in pie crust. Pour sauce over greens. Sprinkle cheese on top. Bake in 350°F. oven for 15 minutes.

Watercress-Chickweed Salad

1-½ c watercress, washed
1-½ c chickweed, washed
1 wild onion, chopped
1 t parsley, chopped
½ c chick peas, cooked
½ c yogurt
2 T mayonnaise
1 t vinegar or lemon juice
1 hard-boiled egg, sliced

Place first 5 ingredients in salad bowl. Mix together yogurt, mayonnaise and vinegar. Pour dressing on salad just before serving. Garnish with egg.

mushrooms: a coin turning color, mice chewing on them, etc. You simply have to learn which are edible, one by one. (For additional information, see "Mushroom Fascination" in the May/June 1975 *Montana Outdoors.*)

HERB TEAS

Herb tea used to be a household stand-by. It went out of fashion for a while, but now it's making a comeback. Some herb teas are considered home remedies, but for the most part they are a hot beverage that takes the place of Oriental tea. Herb tea is an infusion made from an herb. It does not have to be made from a leaf. For example, rose hip tea is produced from the fruit of the rose bush. Dozens of wild plants make good tea and many also furnish considerable amounts of vitamin C.

Rose hips are so rich in vitamin C that they are used commercially to make vitamin pills. Pick the hips in early fall and dry outdoors in the shade or indoors at room temperature. To make the tea, grind or crush dried hips. Use one teaspoon for each cup of tea. Steep the tea for 10-15 minutes. Herb teas generally do not contain caffeine or tannic acid, so they can be steeped longer than Oriental teas. You obtain more flavor with longer steeping and also more vitamin value. Since the flavor of rose hip tea is mild, you can add cinnamon and clove, a mint leaf or a curl of dried orange peel. There are few hard and fast rules for herb teas; make your own combinations.

Mint tea is a favorite with almost everyone. There are several kinds of mint: field mint, peppermint, spearmint. After you locate mint patches in the wild, you can cut and dry a good supply and you can also bring home a root and plant it in your garden so you will have fresh mint.

Wild strawberry leaves have been used for tea since pioneer days, partly as a spring tonic. You can make tea from freshly picked wild strawberry leaves or from dried leaves. There isn't much flavor, so you might want to add mint leaves or dandelion root. Using honey instead of sugar to sweeten the tea also adds flavor. In fact, many people use nothing but honey with herb teas. Honey seems to blend with the herb flavor instead of overpowering it.

Other berry leaves you can try are raspberry and huckleberry. Some people dry a few berries to use along with the leaves.

Some of the same plants used as spring greens can be dried for winter teas: dandelion, watercress, violet (*Viola* species), plantain (*Plantago major*), nettle, shepherd's purse (*Capsella bursa-pastoris*), alfalfa (*Medicago sativa*) or clover (*Trifolium* species).

Don't expect a dark color from herb teas; most are very pale. You can add some roasted dandelion root if desired. That provides both color and a more pronounced flavor.

Indians and early explorers used pine needles (*Pinus* species) and Douglas-fir needles (*Pseudotsuga menziesii*) for tea. The taste is a bit resinous, but not unpleasant. The needles are sufficiently rich in vitamin C to prevent scurvy.

Whether your favorite tidbit from the wild is a tea or a fruit sauce or a salad, the eating is only part of the enjoyment. For me, the gathering is just as important. I celebrate each season with the appropriate outings. Some excursions are like visits to old friends. "Hello, watercress," I say. "How are you this year?" I almost tiptoe toward the asparagus along the Bitterroot River, but I pick very little. I need it more for my spirit than for my stomach.

Berries I revel in. My hands reach out all by themselves. Such feasts! Such bounty! I look forward to the ripening of each wild fruit like the coming of a holiday. Wild edibles are indeed cause for a year-round thanksgiving. "Thank you, Montana," I say, "for your rivers, forests, mountains, valleys—and for the bounty that lies within." ■

Rules for Eating Wild Plants Safely

(1) Do not eat anything you cannot positively identify. There are poisonous plants you must avoid.

(2) Be prepared to study. There is no short cut to learning about edible wild plants. The best way to learn is to have a guide who takes you on field trips. The next best way is to take a course. A third possibility is to buy books and study on your own.

(3) Learn the scientific names. Too many plants are called pigweed, chickweed, wild spinach, etc.

(4) Learn the plant in all stages of growth: first shoots of spring, flowering plant, fruit stage, dry winter stage.

(5) Start with one or two; you cannot hope to learn all edible plants in one season.

(6) Know what part of the plant is edible and when it is edible. For instance, the fruit of the elderberry is edible when ripe, but toxic when green. The green twigs are always toxic.

(7) Use recipes. In order to enjoy wild plants, you have to prepare them properly.

(8) Eat just a sample the first time. Our 20th century stomachs are not accustomed to pioneer fare. Also, different people react differently to new foods.

(9) Watch out for contamination on and around the plants in the form of sprays, fertilizers or animal wastes.

(10) Know the common poisonous plants of the area. When learning a new edible plant, a good question to ask is: "Is there anything poisonous that looks like this?"

(11) Teach children not to eat any wild plant unless it is picked for them by an adult.

Dear F&G

Readers React to Wilderness Issue

Congratulations for presenting a balanced, objective overview of wilderness issues in the Jan./Feb. 1978 *Montana Outdoors*. It is refreshing to see a factual approach to a topic so often clouded with angry rhetoric.

I would like to respond to some of Dr. Robert Wambach's comments concerning wildlife managment in wilderness areas. In the past, the Forest Service (FS) has interpreted the Wilderness Act of 1964 more strictly than was intended by the act's Congressional sponsors. FS officials have often stated that such measures as fish stocking, animal transplants or administrative use of mechanized equipment are not allowed in wilderness areas. Dr. Wambach's reservations about wilderness designations are presumably based on the past performance of the FS.

Now we have a new administration which is directing the FS to be more flexible in its wilderness management policy. Dr. M. Rupert Cutler, assistant secretary of agriculture, described this new wilderness management policy in the July 1977 issue of *Journal of Forestry*. Dr. Cutler's policy statement indicates that many techniques to improve wildlife habitat are permitted in wilderness areas.

Fish stocking and animal transplants are allowed, according to Dr. Cutler, mainly to re-establish vanished species in areas they once occupied. Mechanized equipment, such as airplanes, may be used for this purpose if needed, but preferably not during times of heavy visitor use.

There is not a total prohibition on administrative use of machinery in wilderness. For example, helicopters may be used to evacuate people in emergencies and chain saws may be used by the agency to clear large logs from trails.

Finally, wild fire need not be suppressed in all cases. The FS recognizes that fire suppression is itself a form of habitat manipulation. Carefully developed plans to let some wild fires burn in wilderness areas have been successfully tested in Grand Teton National Park and in the Selway-Bitterroot Wilderness. Of course, the agency can use whatever means necessary, including heavy equipment, to put out fires which threaten to explode into disastrous conflagrations.

It looks as if the managers of our wilderness areas have the authority to protect and enhance wildlife habitat under existing law. It does not seem necessary to set up a system of "backcountry" areas as a substitute for wilderenss areas, in order to improve or maintain wildlife habitat. Carefully managed, wildlife can flourish in wilderness areas. Certainly, a system of "backcountry" areas is appropriate for those areas which show substantial signs of human use and therefore do not qualify for wilderness designation.

Again, my appreciation for a well-researched issue.—*Fred Swanson; Ennis, Mont.*

* * * * *

We wish to compliment you on an outstanding Jan./Feb. 1978 issue. We always enjoy the magazine but we thought this issue was especially good.

It is good to have discussions at this time about wilderness and wildlife and the various areas proposed for wilderness and roadless designation. Mr. Frome's thoughts on wilderness were inspiring. The pictures throughout the magazine are incredibly beautiful. All we can say is "a better magazine was never published."

We are wilderness oriented, having lived in the Rockies for 48 years operating a dude ranch and outfitting business. More "people pressure" each year tells us they want and need more wilderness. Without it, there will be no wildlife, no way to protect the animals great and small that, like man, need room to live.

Thank you for helping Montana make its great decisions for the future.—*Alice and Ken Gleason; Choteau, Mont.*

* * * * *

What a trip I've been on—through the pages of your Jan./Feb. 1978 issue.

In one of the finest valleys of this immaculate land where I daily must face the ravaging threat of Ski Yellowstone, I am compelled to thank you for the perspective recovered in your pages. To preserve the heritage of this monumental land from total destruction, sheer greed and utter degradation at times seems that impossible dream, but you have shared that dream with me and renewed my resolve.

Such talent, such respect, such utter acuity.—*Nona Smith; West Yellowstone, Mont.*

* * * * *

On behalf of the Montana Wilderness Assn., I would like to convey our thanks for the department's superb Jan./Feb. 1978 issue. An objective airing by the department of wilderness issues facing Montana is certainly long overdue.

One point we would like to make deals with Director Robert Wambach's backcountry concept. As you are aware, the Forest Service has exercised administrative authority to establish "backcountry" under various other names since the late 1920s. Yet it was the staggering inroads allowed by the Forest Service, under increasing pressure from commodity interests, which prompted passage of the Wilderness Act in 1964.

The association finds Dr. Wambach's concept of statutory "backcountry" intriguing; however, the timing of such a consideration concerns us deeply; for until inclusion of key roadless areas in the nation's wilderness preservation system is complete, Congressionally designated "backcountry" would serve at odds with that purpose.

We do see statutory "backcountry" in the future as an invaluable management tool and certainly would work closely

Policy On Letters

We welcome comments from readers. However, we will at times be forced to cut down lengthy letters because of space limitations. We appreciate hearing from you, but if you want us to print your letter, please keep it brief. The opinions expressed in the "Dear F&G" section do not necessarily reflect those of the Montana Dept. of Fish and Game. They represent the author's views only.

recycled paper

with individuals and organizations of varied interests in achieving such a statute.

Our thanks for your continued excellent publication.—*Mike Comola, president, Montana Wilderness Assn.; Helena, Mont.*

* * * * *

The first copy I saw of *our* Jan./Feb. 1978 issue of *Montana Outdoors* was in Ann Arbor, Mich. It was late in January and the magazine was lying on the kitchen table of a friend of mine, with whom I was visiting. Since it had been some time since I was home in Montana and had not had an opportunity to read my own copy, I picked his up and idly glanced through it. Then I began to read with more and more interest.

Let me compliment you on a fine individual issue. If the principles of wildlife and land management so cogently laid out in this issue are adhered to, Montanans can hope for nothing better and can look forward to a long future of superior recreational opportunities.

Frankly, I had reservations about the "new" Dept. of Fish and Game administration and was dismayed with what I interpreted as a withdrawal from the wilderness concept. I feared our proposing "backcountry" as an alternative to wilderness designation would lead to losing the opportunities for advisable management in existing wilderness. It seems we, who feel wilderness is an absolute necessity for survival of the quality and style of Montana life, can take considerable solace in a reaffirmation of past Montana Dept. of Fish and Game policies.—*Roland Cheek, The Skyline Outfit; Columbia Falls, Mont.*

* * * * *

You are to be commended for putting out the excellent Jan./Feb. 1978 issue of *Montana Outdoors*.

The discussions regarding wilderness and backcountry are a good springboard for further scrutiny of all roadless values of areas such as the nine very special ones which you briefly describe in your article, "Current Wilderness Proposals." The future of Montana's remaining roadless lands will truly be decided in the very near future, via environmental impact statements, RARE II decisions and Congressional activity. All of these bear close watching.

Keep on publishing the pretty pictures, and continue to present the land management issues, no matter how controversial they may be.—*Gene Sentz; Choteau, Mont.*

* * * * *

The Jan./Feb. 1978 issue of *Montana Outdoors* reflected instances wherein the Montana Dept. of Fish and Game questioned or will question the value of wilderness designation for some areas.

Flathead Wildlife Inc. strongly feels that with the added pressure being placed on our big game herds, Montana needs all the wilderness that can be so protected.

Flathead Wildlife Inc. strongly recommends that the Montana Dept. of Fish and Game truly represent the sportsmen of this state and remain solidly as an advocate for wilderness.—*Alan R. Rader, secretary, Flathead Wildlife Inc.; Kalispell, Mont.*

* * * * *

I would like to commend the entire staff of *Montana Outdoors* for its efforts to explore the issues surrounding the wilderness controversy (Jan./Feb. 1978). I think all factions in the continuing wilderness controversy welcome the interest and involvement demonstrated by the staff of *Montana Outdoors*. I think it is important for the Dept. of Fish and Game to speak out when necessary to defend the best interests of wildlife populations against growing political pressures from industry, agriculture and conservationists.

I have a special interest in a roadless area which is being considered for wilderness classification and was described in this issue as the Scotchman Peaks area. I have hiked extensively throughout the area and have seen mountain goats, black bear, elk and white-tailed deer. Grizzlies and mountain lions have been seen in the area. It seems as though the major barrier to wilderness classification is potential mineral development in the area. ASARCO, Inc. has applied to the Dept. of State Lands for a permit to mine at Mount Vernon, which lies just beyond the eastern boundary of the proposed wilderness area. ASARCO also holds claims at Ross Point and Star Gulch, both of which appear to be more productive than the Mount Vernon claim. It looks as though ASARCO plans to initiate large-scale mineral development in the Cabinet Mountains west of Bull River. What impact will this have on wildlife habitat in this area? I hope the Dept. of Fish and Game will address itself to these problems in its portion of the draft environmental impact statement for the Mount Vernon project.

The state of Montana is going to face some very difficult resource-related problems in the next five years. We have a distinctive way of life in Montana which is molded by the environment and the character of the persons inhabiting the state. It is being challenged daily by those from without who are anxiously coveting our resources. Montana's heritage is defined by its wildness, open spaces and abundant wildlife; I hope the Dept. of Fish and Game will continue to fight to maintain these resources.—*Brian Shovers; Missoula, Mont.*

Red Flag Flies Again

I read "There's a Red Flag on Deer Mountain," by Jim Posewitz *(Montana Outdoors,* Sept./Oct. 1977), while sitting in my doctor's office. This man stirred me up so much I had the nurse give me a piece of paper so I could write you a letter.

I followed Mr. Posewitz' vivid story

Next Time

Watch for these features in the July/August 1978 *Montana Outdoors:*

South Sandstone. Here is one case where development of water resources for irrigation benefited wildlife and recreation. by Dave Hall

EHD. Ken Walcheck answers questions about a mysterious disease that haunts Montana deer herds.

Rain, Fires and the Early Bird Season. Does the early bird season create fire hazards? John Weigand presents the facts.

Whitetail. Ken Walcheck presents the life history of one of Montana's most popular big game animals.

Salmon and Placid Lakes. Land recently donated on these two lakes by Champion International is now the subject of planned recreational development. by Ron Holliday

Don't Pollute Montana Rivers. Unless you want six-digit fines imposed by the state of Montana, writes Bill Phippen in his article about water quality violations by Burlington Northern.

and believe me, it raised my ire also. While I never hunted in Montana, I brought home many trophy whitetails and mule deer from just west of you in Bonner County, Idaho in the 1920s and '30s. Yes, I am an old (68) man now, and we have the same greedy, money mad scoundrels moving in and destroying beautiful Oregon.

Like the man in the story, I taught my sons how to hunt. As a logger since 1928, I spent most of my time in the mountains, wresting my livelihood from Mother Nature. A mountain to me is part of the biggest temple in the world. It is the one that God built and I always feel closer to God up high among the mountains.—*William M. Paul; Lebanon, Ore.*

Placing Bets

Tonight I finally got around to reading "Oil and Gas Leasing" in the May/June 1977 *Montana Outdoors.*

Historically, the article had great impact on me since I recently attended the Great Bear Wilderness hearings in Kalispell and will soon participate in land-use planning decisions for the North Fork of the Flathead River.

I'll "place my bet" with Hugh Zackheim, author of the article, and Donita Sexton, illustrator, who made an excellent contribution to the concern of many of us—the problems of oil and gas leasing in Montana.—*Gail Atkinson; Kalispell, Mont.*

Weed Control: The Debate Continues

Weed control and the use of pesticides in general have, for years, been the issue of some very hot and one-sided debates. We should all be responsible enough to take the time to learn something about what we're going to stand for and to view both sides.

First, let me point out some of the facts. With farm prices at their current levels, pesticides are necessary. Our farmers cannot economically grow enough "organic" food to feed us, much less keep themselves from going bankrupt. The public will not accept a wormy apple, either. I will readily admit there are farmers and applicators who are negligent in their application practices. It is not they who should bear the criticism alone.

But have you checked to see where the highest concentrations of pesticides are found? In one survey of four counties in Colorado, the highest residues were repeatedly found in the city sewage system. This was credited to irresponsible use by home owners on their yards. Compared to farm fields and drainage ditches, the concentrations were an average of 1,000 times as strong.

Let's all take a closer look at ourselves and our neighbors and try to better educate the public of its responsibility.—*Steven Gilger; Lima, Mont.*

* * * * *

After reading the letters in "Dear F & G" about unnecessary weed control (Jan./Feb. 1978), I got a little excited about nonagriculture people saying what is wrong with agriculture. This type of malice follows that of anyone being able to "argue a lot with the fewer the facts."

Chemical weed control is a necessary, integral part of food production. Without it, you would pay much more for your food because there would be less to go around. If you feel you are getting dive bombed with pesticides, move out or stay inside. If the chemicals were not safe for use, they wouldn't be spraying with them.

Road spraying is also necessary to keep the noxious weed population down. If the county does not attempt to control weeds, why should the farmers? Also, how can a farmer control and clean up his fields if the road ditches are breeding grounds for weeds?

Don't say to mow the weeds because mechanical control during the spring would require at least three trips on the roads and twice the labor as chemical control.

The Environmental Protection Agency has launched a huge program to restrict use of certain chemicals. Those types of chemicals that are slow acting and long lasting have been outlawed. Chemicals we use today are less persistent and decompose quickly.

Pressure groups that only realize one side of the program have caused agriculture more problems than anything else.

Just remember the amount and quality of your foodstuffs would suffer greatly without agrichemicals.—*Jim Landa, Sheridan County extension agent; Plentywood, Mont.*

* * * * *

I want to commend Dr. and Mrs. Mike Murdock, Ronan, for their letter, "Unnecessary Weed Control," in the Jan./Feb. 1978 *Montana Outdoors.* I agree with every word. I am a farmer, but I do not believe in pesticides. I've had trouble and losses due to neighbors aerial *and* ground spraying and Pondera County roadside weed control work. The latter is expensive to the taxpayer, dangerous to domestic animals and wildlife and *not* effective. For years, the county has sprayed the roadsides and the noxious weeds are still there. The spray kills plants such as alfalfa and sweetclover that would naturally help to check noxious weeds. No way can animals and birds know that if they stick their heads through the fence or run under it, they will be poisoned.

It is claimed the pesticide is harmless—no way. Poison is poison and it takes its toll. A veterinarian diagnosed illness in some of my animals as being caused by weed spray. I complained to the county officials and it fell on deaf ears. The air reeks of spray for days. One plane spraying a field along a county road left such a drift that it felt like rain mist on my face as I rode horseback on the road shoulder.

What is it going to take to stop this expensive, dangerous and harmful spread of poison? Not only is foliage polluted, but so is the water. Years ago there was no such practice and the weeds were no worse; but the process is lucrative to the chemical companies. I've farmed for 45 years and I *know* mowing and cultivating is effective and a lot safer for man, beast, birds and fish.—*Idell Moore; Ledger, Mont.*

Buck Compton: A Fine Man

I just read of the death of Buck Compton in the Jan./Feb. 1978 *Montana Outdoors.* I just had to write this letter and share with you my appreciation for this fine man.

I met Buck in Miles City in the late 1960s. I was scoutmaster of Boy Scout Troop 241 there and Buck was in charge of the Explorer Post. His Explorers put on programs for our troop a few times. He was everything the article in the magazine says he was. He was always available, always willing and a friendly straight-talking gentleman.

Two things in my experience with Buck readily come to mind. The first is a Troop 241 spring camporee of which I took movies; it was held in Medicine Rock Park near Ekalaka, Mont. In the film, there is Buck, talking to the boys about the ecology of the area. It was over 100 miles from home and there was no money in it, but Buck came because he cared about the boys there. That's the kind of guy Buck was.

The second thing I recall was just before I left Miles City and moved to Wisconsin. I was working at the hospital in Miles City and Buck was a patient. We began visiting and talking about my upcoming move. I mentioned I would be able to hunt squirrels like I did when I was a boy. Buck said he guessed that

could be fun, but that Montana was as far east as he cared to go. Shortly thereafter, I moved east and Buck moved west. He made the better move.

Buck's funeral wasn't on national TV, but there are many, many lives that are a lot richer because they walked a stretch of that road alongside Buck Compton. I'm one of them, and I'm thankful for it.—*Bill Spicer; Groton, S.D.*

Refreshingly Different

I first "discovered" your magazine when I was chaplain of the Montana Senate back in the late '60s. I thought, at the time, that it was a great magazine, but now I believe it is the "greatest."

First of all, let me say that it is most refreshing to peruse a magazine and not have to pick your way through hundreds of advertisements. It is harder to follow some articles through some magazines than a set of tracks over rocky terrain in dry weather. I appreciate the fact that carrying advertisements is the only way most magazines could continue to operate (so I continue to read them), but *Montana Outdoors* is refreshingly different. The articles are fascinating and informative, the feedback is thought provoking (sometimes provoking) and the photography is some of the best we have ever examined. We wish you well and hope that this—like Montana wilderness areas—will be around for decades to come.—*Shel Helsley; Deer Lodge, Mont.*

Car Pools Called "Inconvenient"

The Montana Energy Advisory Council's suggestion about car pools made me nauseated and irate *(Montana Outdoors,* Sept./Oct. 1977).

They have a lot of nerve suggesting that we working people—those of us who use one-third of all private auto mileage commuting to and from work—be submitted to the inconvenience, delay and aggravation connected with car pools. Why don't the state and the council direct their suggestions to the majority, the remaining two-thirds who waste more gas than we who need our cars to make the money to pay the salaries of the state employes and those of the Montana Energy Advisory Council? It's about time some government agency got after the families who have one or two cars, campers, boats, snowmobiles and motorcycles. They burn up 10 times more gasoline than working people going to and from work.

Then there are the nonworking young people who drive for hours around a number of city blocks as a form of entertainment, thus consuming huge quantities of gas. There are also the ones who drive to school because they are too lazy to stand and wait for the bus, or it is too much of an inconvenience to take the bus.

I could go on and on. Back off on the working people who own one vehicle and use it only for work. When I confronted one of the young people mentioned above about the waste of gasoline involved with driving a car around a few blocks, his answer to me was, "I don't care. My parents buy the gas."—*Ginny Mercanet; Billings, Mont.*

Contributors

Some of Montana's record fish have been mounted by taxidermists and hung in pubs, restaurants, meeting rooms and offices around the country. After verification, others have been cooked and half eaten before department information officers can even get a photograph of the record setter. So what do you do? Do what **Mike Aderhold** did—forget about the photo and accept a tasty morsel of the record-setting fish. For more good fishing yarns and information on Montana's record breakers, turn to "Fishing Record Recap" on page 2. Aderhold is the department's information officer for the Glasgow region.

A free-lance writer on assignment for *Montana Outdoors*, **Benjamin S. Kaghan** examines a method of garbage disposal in public recreational areas that saves money. The pack in, pack out system has proved its value in "Getting the Trash Out." His article leads off "The Catchall" on page 7.

MO's winter quarter intern, **Bill Phippen**, updates the situation on the North Fork of the Flathead River. This time Sage Creek Coal Ltd. has applied for a license to divert Howell Creek, a major tributary of the North Fork and a primary spawning stream for Flathead Lake's Dolly Varden population. "When a Stream Gets in the Way—Move It" begins on page 9. Phippen has returned to graduate study in journalism and natural resource management at the University of Montana, Missoula.

MO continues its series of "Recreation Guides" with "Wild Edibles." Some of the material in this article came from **Kim Williams'** book, "Eating Wild Plants," published in 1977 by Mountain Press Publishing Co., Missoula. Many of the chapters in the book first were seen in her weekly column, "Tidbits," appearing in the Sunday Missoulian. She also writes a column, "Kim's Corner," for the Montana Standard in Butte and teaches a course titled "Edible Wild Foods" for the Continuing Education Dept. at UM. Although she includes a partial list of reference materials on wild edible plants in her book, she says there are so many new books coming out each year that any published list is soon out of date. She suggests a visit to the public library to look over the various texts and references before making any purchases. Her article—which *MO* is pleased to offer—begins on page 11.

As Lt. Gov. **Ted Schwinden** points out in his guest editorial on page 23, "...we may well, at some time in the not-too-distant future, consider water the greatest wealth this state has." Certainly the Yellowstone River provides examples of the many problems facing Montana water. "Waters of the Yellowstone" is adapted from Lt. Gov. Schwinden's keynote address to the Montana Chapter of the American Fisheries Society, presented in January 1978.

Ken Walcheck continues the series on nongame wildlife with a look at "Montana's Little Dipper," the water ouzel. Although scientists who study birds don't know the reasons for the ouzel's peculiar bobbing motion, it may be a form of communication—a signal in a world of thundering rapids and cascading waterfalls. Turn to page 26 for more information on this living symbol of environmental quality. Walcheck is the department's information officer for the Miles City region.

Learning "The Art of Unhooking the Big Ones" might well mean that anglers will have the opportunity to catch some of the "big ones" again. But does catch and release fishing mean the fish will, in fact, survive to be caught again? The answer isn't simple and many factors influence the ability of the released fish to survive. For some tips on hooking, playing, unhooking and releasing fish to increase their chances for survival, turn to **Ron Marcoux's** article on page 28. Marcoux is the department's fisheries manager for the Bozeman region.

Waters of the Yellowstone

by Ted Schwinden

This editorial is adapted from a keynote address by Lt. Gov. Ted Schwinden to the Montana Chapter of the American Fisheries Society, Jan. 19, 1978 in Billings, Mont.

The "reason to be" for the American Fisheries Society is fish—and, according to an old torch song, "fish gotta swim." If "fish gotta swim," they have got to swim in water—and there are few matters equal to water in its importance to Montana.

That fact was brought vividly home to us last year, when drought throughout the Northwest threatened to cripple both agriculture and industry and brought into very real perspective the possibility of electrical curtailments and rolling blackouts for this state. With our dependence on water, its many uses to us and the superior quality and quantity of Montana water, we may well, at some time in the not-too-

The Yellowstone River south of Livingston. F&G photo: Craig Sharpe

distant future, consider water the greatest wealth this state has.

Dominant in recent months have been conflicts regarding the Yellowstone River; perhaps it would be germane to discussions today to focus for a few moments on that river—especially as the Yellowstone provides examples of the many problems facing Montana water.

When St. Louis fur traders were first informed of the great "Yellow Rock" river in the 1790s, they could not have imagined the significance the majestic Yellowstone would have almost 200 years later on development of the Northwest. Today, amidst debates, moratoriums and a scramble for its precious contents, the Yellowstone River is a mighty symbol of the complex interrelationship between man and nature and our interdependencies as a state and as a society. We are trying to parcel out, with wisdom and good judgment, bits of a river that is millions of years older than we are.

The Yellowstone has survived natural fluctuations in its annual flow for years, adapting to seasonal high and low water levels in its own way. But as we try to satisfy all the demands on its water supply, we must remember that the Yellowstone may not be able to cope with massive withdrawals for human demands. We cannot presume to become the gods of the river; instead, we must cooperate with the Yellowstone and integrate our needs with its abilities to fill them without exhaustion. The river is, somewhat to our surprise, finite after all.

The Yellowstone supports a complex ecosystem composed of numerous aquatic and terrestrial creatures. More than 80 species and subspecies of fish alone—from cutthroat trout to the mysterious paddlefish—inhabit the river. It has long been a haven for wildlife and a source of recreational pursuits.

But the Yellowstone serves also to remind us of a more basic question that affects all water resource allocations throughout the state: How do we maintain the fisheries resource without gravely disrupting the economic demands of both Montana and the nation? That question continues to plague those concerned with maintaining the balance of nature.

The question of water resource allocations presents what is perhaps the greatest risk to Montana fisheries. In apportioning water usage, the state must attempt to satisfy requests from a variety of competing agencies. Regarding the Yellowstone, the Board of Natural Resources and Conservation has received water reservation applications from municipalities, conservation districts, irrigation districts and the Depts. of Fish and Game, State Lands, Natural Resources and Conservation, and Health and Environmental Sciences. In addition, the Dept. of Natural Resources and Conservation has pending before it several permit applications for large quantities of water for industrial use. These applications are now suspended by the "Yellowstone Moratorium." It is clear that no matter how collectively wise its decisions, it will *not* be able to fully satisfy all these interests. I do, however, have great confidence in the ability, and the integrity, of the Board of Natural Resources and Conservation as it deliberates and decides this most important agency decision of our time.

We must cooperate and coordinate these diverse interests if we are to preserve the sanctity of the Yellowstone. A multitude of factors must be considered before resolving this complex issue.

For example, in determining allocations for municipalities and conservation districts, the state must consider population growth factors which are based on predictions that are closely interwoven with economic and industrial development. Industry and municipalities may compete for water rights in the same area.

A major industrial development, such as coal, may depend on whether developers can obtain enough water by water use permits for developmental requirements. This, in turn, will depend on a careful study of the boom-and-bust effects coal development may have on small Montana towns. Even in this one example, the question of water allocations is an involuted issue closely interwoven with the interests of other agencies.

And the question of water allocations can no longer be deferred. With the dwindling availability of foreign energy supplies and the increasing emphasis on energy self-reliance in this country, the need to develop domestic energy sources is pressing. Americans, who have learned to equate electric pencil sharpeners and hair dryers for men with a high standard of living, have become energy-addicted and we cannot withstand the overwhelming national demand for energy. But we must make valiant attempts to consider the water-depleting consequences of meeting that demand.

A 1972 Bureau of Reclamation study estimated that up to 2.6 million acre-feet of water may be required each year in the Yellowstone for coal development. Coal conversion power plants are highly water intensive. Estimates vary from one acre-foot per year per megawatt to 20 acre-feet per year per megawatt. If Colstrip generating plants #3 and #4 are built, the Colstrip complex will produce 2,100 megawatts per year.

Generally, the cost of electric conversion from coal increases as the amount of water consumed during the process decreases. Therefore, the most *cost* efficient method of converting coal to electricity also utilizes the most water.

If coal gasification plants were built, they could use up surface water necessary for other uses or consume enough ground water to dry up nearby wells. And coal gasification plants could greatly increase the potential for irretrievable water consumption and degradation—at least at the present state of the technology. Another suggested alternative has been to build coal slurry pipelines to transport coal to energy intensive areas for conversion—a potential discouraged by this administration, as pipelines would require about 600-800 acre-feet to move 1 million tons of coal. Montana law does not consider using water to export coal from the state a beneficial use; therefore, coal slurry pipelines to export coal from Montana are now prohibited. Whatever method of coal development is used, the state's water supply will be affected.

But coal is not the only water user. Because agriculture

is an essential industry to Montana, its water use needs must receive high priority.

In the Yellowstone Basin, agriculture provides more than economic benefits. It also shapes the life style of the region. Some 650,000 acres of land in Montana's portion of the Yellowstone Basin is either fully or partially irrigated, consuming about 1.9 million acre-feet yearly. Since 1971, the use of irrigation, particularly with sprinkler systems, has expanded steadily. Soil surveys indicate that another 2.2 million acres in the area is irrigable. Modern irrigation technology requires between 2 and 3 acre-feet of water for every acre irrigated. The needs of this state, this nation and the world for more and more food are both accelerating and critical. Market projections by federal agencies indicate this country will have to *double* agricultural production in the next 50 years. To protect the farmers' and ranchers' irrigation needs, it is necessary to reserve a quantity of water for future expansion.

The state recognizes its responsibility toward agriculture, and prohibits the transferral of agricultural water rights exceeding 15 cubic feet per second to industrial use. In addition, existing water rights cannot be usurped by new applications. Since many irrigators have used water rights for years, they are protected from removal of those rights. Nevertheless, with agriculture and industry competing for water, the growth of either field in the state may rely heavily on the determination of water reservations.

While industrial and agricultural interests vie for water consumption rights in the Yellowstone, the state must keep an eye on the river's environmental well-being. The Dept. of Fish and Game's request for in-stream flow preservation is a unique and innovative method of protecting minimum flows in the Yellowstone. Protected by in-stream flow reservations, the river could continue to promote a variety of uses such as recreation, fish and wildlife habitats, water quality, aesthetics and downstream water rights. Although the law gives priority to water rights in order of priority date (first in time and first in right), in actuality, irrigators upstream may benefit more than those downstream. During low flow years, upstream users have the first chances to divert the water. If they use all the water, until the streams are adjudicated under the new Water Use Act, farmers and ranchers downstream with prior rights have no practical recourse except to sue the upstream user. Arguably, if the fish and game request were granted, it would help to assure a minimum instream flow for downstream irrigators.

In-stream flow reservations could be guaranteed by an extensive monitoring system set up at various points along the river and would be reviewed periodically to assure that the entire amount of water reserved was actually needed. The resources allocated to fish and game would not be available to other competing users in the state unless studies determined that less water was needed to preserve a minimum flow, and the reservation was reduced by the board. Above all, the fish and game request would accrue large benefits for those parties unable to insist on high water quality standards—the fish and wildlife which call the Yellowstone River "home."

Before 1973, those concerned with preservation of wildlife and natural habitats could not compete for water resource allocations in the state. The biologist could only stand on the sidelines as a critic. But the Water Use Act of 1973 granted environmental quality concerns the right to compete for resource allocations alongside other interests through the water reservation process.

It is time those agencies surrender their roles as critics and become the standard-bearers of efforts to preserve the environmental quality of Montana's rivers and streams. The most effective place to start would be in the Yellowstone—the nation's last, great, free-flowing river.

However, these agencies cannot perform single-handedly. They must be sensitive to the desires of the public, and they must know how much the public will allow. And the public must be well informed in order to aid the agencies. Where this process becomes a matter of mutual dependency is in the fact that the public must depend on information furnished by the agencies. That information must be collected responsibly and without bias.

Because they are now participants instead of critics, the agencies must put their statistics and policies on the line where they will face stringent challenges, not only from water usage competitors, but also from those groups charged with granting the allocations. It is essential that the information supplied by the agencies be furnished with its credibility intact. Accurate research is vital in determining the best uses for water in the state, and an informed public is needed to make decisions regarding those uses.

It is true that coal development and expanded irrigation would produce greater revenue for the state, but those economic gains must be tempered with a concern for the fate of the environment that not only provides Montana's life style, but also makes the revenues possible.

In the meantime, agriculture, energy interests, industry and the state's environmental guardians are playing tug of war with the state's water resources.

The moratorium on Yellowstone River water use applications has given us an opportunity to re-evaluate and study the various requests for Yellowstone water. When the moratorium ends, it will be time to act. How we resolve the issues of water allocations on the Yellowstone may form the basis of our future attitudes toward all water in the state. Those attitudes and those resolutions will affect fisheries in primary ways.

In Montana, the good health of agriculture and industry is not a public *want* but a vital public *need*. In order to maintain an adequate state of health for those interests, the water of this state must continue in quantity. For municipalities, for fisheries, for a multitude of other purposes—including a matter of pride—the *quantity* of water must also maintain *quality*. To combine those essential goals in a mutually satisfying conclusion is the responsibility and the challenge facing the government and the people of this state.

In order for this river—and all rivers—to "keep rollin' along," we must act with wisdom and with prudence. And we must do so now. ■

Montana's Little Dipper

by Ken Walcheck

POISED ON A mossy granite boulder in the center of a rushing mountain stream, a compact, slate-colored bird with a stubby tail teeters rapidly up and down, then bursts into a fluty, wren-like song, clear and sweet with trills and rhythmic flourishes.

As silvery droplets of frigid water splash against its feet, the robin-sized water ouzel suddenly plunges into a clear pool and disappears. With boundless energy and what appears a total disregard for safety, the ouzel propels itself to the bottom with its partially extended short wings. The movement includes a complex combination of downward and rearward strokes.

Once on the bottom, it "walks" quickly along the gravel, probing and picking up aquatic insects with its bill which curves slightly downward. After foraging, the ouzel darts upward, wings pumping as if in flight, and pops to the surface 20 feet from its original perch. After breaking water, the plump bird takes flight, rapid wing beats carving the air just above the water, until it lands on another boulder.

The ouzel is one of five species composing the family Cinclidae. It inhabits mountainous areas of Europe and Asia, as well as the western highlands of North and South America. All species are quite similar in appearance and males and females look alike. Juveniles have spotted breasts, underscoring the family's kinship with the thrushes. Our native North American species, *Cinclus mexicanus,* ranges through the mountainous areas of western North America, from north central Alaska and the Aleutian Islands to Panama.

A solitary bird, the ouzel always lives within sight and sound of rushing waters of mountain streams. "Find a fall, or cascade, or rushing rapid, anywhere upon a clear stream," proclaimed naturalist John Muir, "and there you will surely find its complementary ouzel, flitting about in the spray, diving in foaming eddies, whirling like a leaf among beaten foam-bells; ever vigorous and enthusiastic yet self-contained, and neither seeking nor shunning your company."

The ouzel's most distinguishing trademark—its nervous dipping or bobbing motion—has earned it the names of "dipper" and "teeter bird." Although ornithologists have not discovered the reasons for the bobbing motion, a dipper's dipping is probably a form of communication, a signal in a world of thundering rapids and cascading waterfalls.

When birds took to the air 150 million years before the Wright brothers launched their fragile craft, they were offered a highway to every possible habitat type on earth. A restless world of heaving earthquakes, wandering shore lines, shifting climates and changing vegetation can scarcely be expected to harbor sedentary tenants. A bird's geographic range, for example, is not likely to stand firm before the chilling, grinding advance of a glacier. As the environment changes, a species must either adapt to the changed conditions, move to a more suitable range or die.

It was in the Miocene geological period, some 10-25 million years ago, that the ouzel evolved from a wren-like creature and turned from a life in the trees to harvesting aquatic life in rushing mountain streams. It forages on adult and nymph forms of stoneflies, mayflies, caddisflies and other aquatic life such as snails and minnows.

A bird intimately tied to mountain streams and rushing water requires specialized adaptations. Movable flaps close over each nostril when the bird submerges and an enlarged preen gland—10 times the size of the gland in any other passerine (perching) bird—supplies oil for dressing and waterproofing the plumage. Beneath its outer feathers, a thick undercoat of down insulates the ouzel against icy waters. Another adaptation is the nictitating membrane, a specialized eyelid which can be drawn over the surface of the eye like a windshield wiper. This semitransparent, movable membrane also protects the eye from water-borne particles. Because of its unique specializations, the ouzel does not migrate to warmer climates, but merely moves to a lower altitude to find running water.

Most ouzel nests are made of soft mosses and grasses, collected along the stream and woven into a compact, dome-like house—a beautifully rounded hut with a small arched entrance on one side. The female builds the nest near the stream—on a ledge, on a rock in midstream, among the twisted roots of an overturned conifer. Sometimes she hides it behind a waterfall curtain. The nests are frequently green and fresh because of the spray from nearby water.

After 16 days of incubation, from three to six white eggs hatch. After living in the nest for 15-24 days, the young take to the water. Once free of the nest, young dippers immediately begin to exhibit the same dipping or bobbing motions as adults.

Like many other wild things, the ouzel serves as an index of environmental quality and its relationship with wild mountain streams is an amazingly intimate one. Although poorly documented, ouzels quietly disappeared from numerous streams in Montana during the late 1800s after intensive gold mining operations literally turned creek bottoms upside down. Clancy and Prickly Pear creeks, south of Helena, represent classic examples. After mining ceased, it was nearly 20 years before one could once again see the teetering and underwater excursions of what possibly may be Montana's most unusual bird.

In the absence of major human disturbances, cohesion and harmony exist between ouzel and rushing stream—successive stages of the beautiful and wild values uncaptured by language and beyond the reach of words.■

The Art Of Unhooking The Big Ones

by Ron Marcoux

"WOW, LOOK AT THAT trout jump!" cried the excited angler as he fought a flashy red-sided rainbow on one of Montana's blue ribbon streams. "Don't horse him or you'll lose him," yelled a nearby observer. As the rainbow trout weakened and came to shallow water, the angler deftly removed the hook and the fish moved slowly from the shallows back into a deep run.

The onlooker couldn't resist asking the angler, "Why didn't you keep him?" The angler smiled and said, "I want the opportunity to catch that one again." This fisherman was one of a growing number who fish solely for sport rather than for putting trout in the pan.

The basic premise behind this kind of fishing—usually called "catch and release"—is that the fish will survive to be caught again. But, will it?

The answer isn't simple, since many factors influence survival of a released trout. Just because it seems to be in good condition when it is released doesn't necessarily mean it will survive. Whether a fisherman uses flies, lures or various baits, he has to go through four phases to release a fish; each influences the ability of the released trout to survive.

(1) **Hooking the fish**—The relationship of the type of hook or lure used and where it becomes imbedded is extremely important. Studies have shown that hooking mortality varies between various bait or lure types. For example, a review of over 40 studies puts mortality from flies at about 4%, compared to about 6% for lures and 29% for bait. Although a fly or lure may occasionally become imbedded in the gills or penetrate vital parts of the head, it is the nature of the bait fisherman to allow the fish to "bite awhile" to insure a better chance of capture. This allows the fish to swallow the bait or increases the chance of hooking it in a vital part. Deeply imbedded hooks can cause almost immediate death if they are pulled out in such a manner as to injure the stomach or vital gill area.

If you intend to release fish, it would be desirable to use flies or lures rather than bait. However, if you use bait and a fish swallows the hook, you can greatly improve the fish's chance for survival by cutting the line close to the fish's mouth and allowing the hook to remain in the fish. Researchers in Wisconsin[1] studied 131 trout, less than six inches long, that had been released with hooks remaining in the throats or stomachs. After four months, 76 managed to rid themselves of the hooks and over 50 still had hooks remaining in their digestive tracts. The study found that growth was not slowed in those fish retaining hooks.

The advantages of treble hooks, single hooks or barbless hooks still deserve more investigation. A study conducted in Maine on landlocked Atlantic salmon[2] showed only 0.3% mortality by treble hooks, compared to 2.7% loss by single hook lures. Another study on rainbow trout[3] showed single hook wobbling lures mortality was similar to treble hook mortality at temperatures of 44°F. (6.5°C.). However, at 58°F. (14.5°C.), single hook mortality was 10%, compared to 5% for treble hooks. Single hooks appear to cause slightly higher mortality since they become more easily imbedded in the gills than do treble hooks. Studies are needed to define barbless hook/trout mortality relationships. Until these studies are completed, the choice is up to the angler. However, barbless or bent barb hooks are much easier to remove than those with barbs.

(2) **Playing the fish**—One of the least understood facets of catching a fish—but one that ultimately may play a greater role in mortality than hooking—is the act of playing the fish. Some fishermen literally "horse" the fish out of the water. Others use the lightest tippets possible to obtain a maximum of playing time and don't

release the fish until it is totally exhausted and lying on its side literally gasping for breath. Investigations have shown that physiological changes occur while a fish is being caught. Hooking stress caused changes in blood characteristics and an 85% mortality resulted in rainbow trout played to exhaustion.[4] Another study[5] showed hooking stress caused more severe blood chemistry differences in hatchery trout than in wild trout and that hooking imposed a greater stress on larger hatchery rainbow trout. This and other studies also indicated that blood chemistry disturbances increased in fish caught at water temperatures around 70°F. (21°C.). Therefore, the combination of higher water temperatures and the stress of being "played" for a considerable length of time may greatly increase mortality. Although these findings require further investigation, sufficient data exist to warrant concern about "playing a fish" until it is "belly up" or totally exhausted.

(3) **Unhooking the fish**—Make every attempt to get the hook out as cleanly and quickly as possible. Long-nosed pliers can be an asset. If you have to hold the fish to unhook it, remember: (a) Keep it in the water—fish need oxygen, too, but theirs is in the water, not in the air. (b) Hold the fish gently—do not squeeze it since vital organs may be injured. (c) Keep your fingers out of the gill area. (d) If the fish is deeply hooked, cut the line if you intend to release it.

(4) **Releasing the fish**—If all other steps have been taken properly, you should not have any trouble releasing the fish. However, if the fish has lost its equilibrium or orientation, gently hold it upright, facing upstream, and move it slowly backward and forward. When the fish responds, release it in quiet water. If you are in a boat, it may help to beach the boat to provide quieter water for releasing the fish. To throw it back into heavy water such as rapids or a long run will only decrease its chance for survival. If a fish has problems recovering after these steps are taken, chances are it will not survive and may best be kept for the skillet.

The complete act of catching and releasing the fish clearly affects its chances for survival. No fisherman can say every fish he catches and releases will survive—no matter what kind of technique he uses. Mortality is associated with hooking and releasing fish. But the degree of mortality depends on the fisherman, the species of fish, the condition of the fish, water temperature and the way the fish is caught, handled and released.

Fisheries biologists for the Montana Dept. of Fish and Game will evaluate the impact of catch and release fishing on a portion of the Madison River during 1978. This research will help define both the value and some of the problems with catch and release fishing for future management programs. Additional investigations at department hatcheries will be conducted to determine mortality rates caused by barbless, barbed and treble hooks.

Until more is known, fishermen who plan to release fish should: (1) Play the fish as rapidly as possible and do not play it to total exhaustion. (2) Keep the fish in water as much as possible while handling it and removing the hook. (3) Remove the hook gently—do not squeeze the fish or put your fingers in its gills. (4) If the fish is deeply hooked, cut the line but do not pull the hook out. (5) If the fish is disoriented, gently hold it facing upstream in the water and move it slowly back and forth. (6) Release the fish only after its equilibrium is restored. ■

Left: A combination of cool water, quick retrieval and minimal handling made this rainbow's chance for survival very good. Below: Even large treble hooks can cause minimal damage when properly and carefully removed. F&G photos: Tom Warren

LITERATURE CITED

[1]Mason, J. W. and Hunt, R. L., "Mortality Rates of Deeply Hooked Rainbow Trout," *Progressive Fish-Culturist,* Vol. 29, No. 2, 1967, pp. 87-91.

[2]Warner, Kendall, "Hooking Mortality of Landlocked Atlantic Salmon, *Salmo salar,* in a Hatchery Environment," *Transactions of the American Fisheries Society,* Vol. 105, No. 3, 1976, pp. 365-369.

[3]Klein, W. D., "Mortality of Rainbow Trout Caught on Single and Treble Hooks and Released," *Progressive Fish-Culturist,* Vol. 27, No. 3, 1965, pp. 171-172.

[4]Bouck, G. R. and Ball, R. C., "Influence of Capture Methods on Blood Characteristics and Mortality in the Rainbow Trout (*Salmo gairdneri*)," *Transactions of the American Fisheries Society,* Vol. 95, No. 2, 1966, pp. 170-176.

[5]Wydoski, R. S.; Wedemeyer, G. A., and Nelson, N. C., "Physiological Response to Hooking Stress in Hatchery and Wild Rainbow Trout (*Salmo gairdneri*)," *Transactions of the American Fisheries Society,* Vol. 105, No. 5, 1976, pp. 601-606.

Is Catch and Release Management for Montana?
see page 28